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Cumulative Impact Study of a 10 km-radius landscape area around Ranthambhore Tiger Reserve towards identifying critical zones for wildlife & ensuring environment-friendly mining practices

भारतीय वन्यजीव संस्थान
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Front Cover: A silica and sandstone mining excavation pit in Karauli District, Rajasthan

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EXECUTIVE SUMMARY

The Standing Committee of the National Board for Wild Life (SC-NBWL) had been receiving several mining proposals for consideration from around Ranthambhore Tiger Reserve (RTR), and often in a piecemeal manner. This had made it difficult for SC-NBWL to assess these projects' overall impacts on wildlife and forest connectivity in RTR's surrounding landscape. On the receipt of two mining proposals, a decision was taken in the SC-NBWL's 70th meeting held in October 2022 to defer all mining proposals around RTR until a '*Cumulative Impact Study Report*' was prepared by the Wildlife Institute of India, Dehradun (WII) towards protecting wildlife habitats and corridors in RTR's vicinity. Accordingly, an area of c. 3,798 sq.km within Rajasthan in a 10 km-radius width around RTR was delineated as the "*Cumulative Impact Study Area*" (or CISA) encompassing parts of the administrative districts of Karauli, Sawai Madhopur, Tonk, Bundi and Kota. The CISA also encompasses parts of RTR Division-I, RTR Division-II, Ramgarh-Vishdhari Tiger Reserve (RVTR), National Chambal Sanctuary Project, and Social Forestry/ Territorial Divisions of Karauli, Sawai Madhopur, Tonk, Bundi and Kota. RTR (core & buffer) itself though is not part of the CISA as the assignment concerns areas in its vicinity. The CISA is described in terms of its forests, wildlife (including surrounding Protected Areas and connectivity between them), land use/ land cover, geology, geomorphology, climate etc. Impacts of mining activities on ecosystems, biodiversity and the environment, in general, are also described.

Utilising available data from ongoing or completed research projects within WII and other data as available from published literature and government repositories, an area of c. 2136 sq.km within the CISA (56.26%) has been determined as "*critical zone*" for wildlife, especially concerning their persistence in the larger Ranthambhore landscape. These are areas with the occupancy and/ or (modelled) potentially suitable habitat of globally threatened and/ or locally rare Schedule-I mammalian species, as per the amended (until 2022) Wild Life Protection Act, 1972, such as tiger *Panthera tigris* (EN), leopard *Panthera pardus* (VU), caracal *Caracal caracal* (LC, but India's most threatened wild cat species), Indian grey wolf *Canis lupus pallipes* (LC, but genetically distinct subspecies and locally rare), dhole (or Asiatic wild dog) *Cuon alpinus* (EN), Indian pangolin *Manis crassicaudata* (EN) and sloth bear *Melursus ursinus* (VU), including their identified movement corridors. The delineated *critical zone* also includes areas within PAs around RTR and areas satisfying the current legal definition of an Eco-Sensitive Zone (ESZ), within which all commercial mining is prohibited, as per the Ministry of Environment, Forest and Climate Change's (MoEF&CC) February 2011 guidelines on the matter. Within the CISA, a "*non-critical zone*" from the perspective of inhabiting wildlife of c. 1,661 sq.km (43.74%) is identified where mining activities may be appropriately appraised, subject to site-specific critical and cumulative impact assessments of the received proposals. If received/ pending proposals are positively appraised, the lessees/ user agencies must strictly adhere to all relevant extant laws, rules and guidelines issued by the Union and State governments from time to time, along with following all relevant orders passed by Hon'ble higher courts of judicature and statutory clearance conditions issued by national and state-level authorities.

Pillar locations' coordinates (intermediate/ all corners) and other associated details of a total 145 mining leases within the CISA were informed through the concerned district offices of the Department of Mining and Geology (DMG), Govt. of Rajasthan. Of these, a

majority (100) mining leases are located within Karauli district, while there are none in the Tonk district. It is, however, unclear if the data provided through DMG offices is comprehensive or complete. The statuses of these leases – whether operational/ lease expired/ applied for renewal etc. – is also either unclear or not known. Given these facts, we found that a total of sixty (60) mining leases – twenty-seven (27), six (06), three (03) and twenty-four (24) in Karauli, Sawai Madhopur, Bundi and Kota districts, respectively – are located within the "*critical zone*" for wildlife delineated in this assessment. Of these 60 leases, thirteen (13) are located either partly or wholly within the legally valid ESZs (as on date of submission of this report) where commercial mining and associated industries is listed as a prohibited activity, while as many as twenty-two (22) mining leases are located within identified wildlife corridors (all in the Ranthambhore-Ramgarh Vishdhari-Mukundara corridor). Three (03) mining leases – two in Bundi district (ML nos. 389/1998, 333/2002) and one in Kota district (23/2003) – are, in fact, located within both ESZs and wildlife corridors.

We observe an enormous scope to regulate and streamline mining activities around RTR towards a more sustainable framework accounting for the needs of both people/ industries and wildlife. While sufficient information on flora and fauna exists (and is being generated) within RTR, a general lack of scientific investigations coupled with insufficient monitoring of wildlife in RTR's immediate vicinity limits this assessment exercise. This is especially concerning since RTR acts as a significant source population of threatened wildlife, including tiger, in the Central India-Eastern Ghats (CIEG) landscape, enabling their long-term persistence in and gradual range expansion into other parts of Rajasthan and the larger CIEG. Hence, we recommend carrying out comprehensive wildlife diversity, distribution, movements, species-habitat relationships, human-wildlife interactions and other such studies towards generating relevant information on these aspects in RTR's vicinity. If several mining and/ or allied industries (such as mineral grinding/ processing plants) are proposed/ exist closely situated to each other, we also recommend conducting cumulative impact (of mining and allied industrial units) assessment studies funded through the State government ascertaining impacts of these activities on biodiversity, ecosystems, environment, and on the lives and livelihoods of human communities living nearby by reputed research institutions having such expertise, using modern research and analytical tools. Such studies may be commissioned immediately for the already existing cluster of proposals in the CISA where mining and/ or allied activities have been taking place since the past few decades (Karauli, Bundi and Kota clusters).

The formation and effective functioning of a participatory monitoring mechanism is necessary to ensure that the short- and long-term requirements and concerns of the most important stakeholders – wild life and local human communities – are not overlooked. We also provide relevant shape and Keyhole Markup Language (KML) files along with full-resolution images and maps generated from this project as a "*Decision Support System*" to the NBWL towards more informed proposal appraisals in the future. Informed decision-making with respect to resource extractive projects backed with robust and regular on-ground data/ monitoring of statutory and relevant laws, rules, guidelines, policies and compliance conditions will greatly facilitate the persistence of threatened species, and ensure the long-term survival and persistence of threatened wildlife in the biodiversity-rich and crucial larger Ranthambhore landscape.

1. INTRODUCTION

1.1 Background

Through a decision taken during its 70th meeting held in October 2022, the Standing Committee of the National Board for Wild Life (SC-NBWL) had deferred the appraisal of two mining proposals – ***FP/RJ/MIN/4863/2020*** and ***FP/RJ/MIN/5863/2021*** – located within 10 km-radius distances from the Ranthambhore Tiger Reserve (RTR), and requested the Wildlife Institute of India (WII) through the MoEF&CC (WL Division) to conduct a **"*Cumulative Impact Study*" towards determining areas where mining can be allowed around RTR** (relevant meeting minutes available as Appendix 1, relevant paragraphs 70.4.38 & 70.4.39 are on minute page nos. 27-29, accessible on Parivesh portal, 111111123212171MoMApproveHMEF.pdf).

> *"Decision taken: After discussions, the Standing Committee decided to defer the proposal till the submission of proposal for declaration ESZ around Ranthambore Tiger Reserve. The Standing Committee also directed that a cumulative impact study be carried out by Wildlife Institute of India in order to determine areas where mining can be allowed around Ranthambore Tiger Reserve."*

The decision was influenced by the fact that the SC-NBWL had been receiving (and will likely receive in the future) several mining proposals (new leases or renewal of existing leases) from Rajasthan in and around RTR in a piecemeal manner, and whose cumulative impacts on wildlife habitats and wildlife connectivity was becoming difficult to determine. The Rajasthan Forest Department (RJFD), through the office of the Departmental Principal Secretary, was requested to provide necessary assistance to WII in conducting the Cumulative Impact Study (Appendix 2).

The said assistance in the form of some of the crucial data needed to compile this Cumulative Impact Study Report was received by WII on its request (Appendices 3, 5, 6, 7, 8) by the RJFD through its Head Office in Jaipur and through some of the relevant Divisional Offices at different points in time during February 10-24, 2023.

A brief timeline of important events pertaining to this Cumulative Impact Study Report's submission beginning from the 70th SC-NBWL meeting is outlined below.

- 13th October 2022 – 70th SC-NBWL meeting held where it is decided that WII shall be requested to conduct a Cumulative Impact Assessment Study in order to determine areas where mining can be allowed around RTR (Appendix 1).
- 03rd November 2022 – MoEF&CC's Wild Life (WL) Division communicates the above SC-NBWL meeting and decision to WII vide letter *F.No.6-175/2022 WL*, thereby requesting to conduct the said Cumulative Impact Study and to submit the Report by December 15, 2022; this letter is copied to the Principal Secretary, Rajasthan Forest Department, with a request to provide requisite assistance to WII in carrying out the said study (Appendix 2).
- 16th November 2022 – WII requests the Principal Secretary, RJFD, Govt. of Rajasthan for relevant information and data pertaining to the preparation of the Cumulative Impact Study Report vide letter no. *WII-EIA/CIA Study around Ranthambhore TR_149*

mentioning that the work of drafting the said Report will commence upon receipt of all the requested information in the desired formats (Appendix 3).

- 16th December 2022 – CWLW, Govt. of Rajasthan responds to WII's above data request vide letter no. *F4(787)WLC/CWLW/2022/2075* stating that a research team may kindly be deputed from WII to compile the requested information, while data available with the Department will be shared with the team members so deputed in the field (Appendix 4).
- 29th December 2022 – 71st SC-NBWL meeting held where the Director, WII informs that the required Cumulative Impact Study Report will be submitted before the next meeting of the SC-NBWL (Appendix 5).
- 30th January 2023 – WII writes to the Principal Secretary, RJFD, Govt. of Rajasthan vide letter no. *WII-EIA/CIA Study around Ranthambhore TR_149* informing details about a WII research team's scheduled field visit to the study area along with a conservative financial resources request to facilitate WII research team's field visit and towards the drafting of the Cumulative Impact Study Report (Appendix 6).
- 31st January 2023 – WII writes a reminder letter to the CWLW, Govt. of Rajasthan requesting all relevant data pertaining to the Cumulative Impact Study Report and informing about further details regarding WII research team's scheduled field visit (Appendix 7).
- 05th-11th February 2023 – A one-week field visit to the Cumulative Impact Study Area (CISA), including the two (02) mining proposals awaiting SC-NBWL appraisal, by WII research team, and relevant interactions and discussions with RJFD field officers and DMG, Govt. of Rajasthan staff regarding wildlife values within CISA, and data provision and facilitation requests (Appendix 8).
- 08th-24th February 2023 – Time period during which some of the required wildlife-related data and mining leases' information obtained through relevant RJFD and DMG offices, both on removable disks/ flash drives while in the field and later over official email (Appendix 9).
- 27th March 2023 – Submission of the Cumulative Impact Study Report to the Member-Secretary, SC-NBWL & ADG (WL), MoEF&CC with a "*Decision-support system*" consisting of relevant shape/ GIS, Keyhole Markup Language (KML), pdf and high-resolution image files over email (in a zipped folder) and in a compact disc (CD) (by post); cover letter dated 27th March 2023 available as Appendix 12.

Upon receiving some of the required crucial data from the RJFD (February 24, 2023), and upon obtaining details of mining proposals from various district offices of the Department of Mines & Geology (DMG), Govt. of Rajasthan (Appendices 9, 10), WII hereby submits the Cumulative Impact Assessment Report within the stipulated duration, as directed by the SC-NBWL and MoEF&CC.

1.2 Scope & Objectives

The scope of this work is limited to the 10 km-radius landscape around RTR (the "*Cumulative Impact Study Area*" or CISA hereafter). The chief objectives in the making of this Report are derived from the 70th and 71st SC-NBWL meetings' minutes and decisions as follows.

1. **Identify *critical zones* where mining may be deleterious towards protecting wildlife corridors and wildlife habitats in and around RTR.**
2. **Provide appropriate recommendations and facilitate SC-NBWL's informed decision-making towards effectively regulating mining activities in the larger Ranthambhore landscape for environment and wildlife conservation.**

1.3 Approach

Since the task assigned to WII was that of conducting a Cumulative/ Holistic Impact Assessment Study around RTR – implying taking a wider perspective of various factors and issues concerning mining and biodiversity – we have taken a similar approach. We first delineate and then describe the Cumulative Impact Study Area (hereafter "***CISA***") around RTR in terms of its forest types, forest cover, land use and land cover, geology, geomorphology, lithology, Protected Area (PA) coverage etc. We then describe the various impacts of mining on ecosystems, habitats and biodiversity, especially in the context of the CISA being a largely semi-arid zone with few sources of freshwater and frequent wildlife movements.

We then present selected rare, endangered, threatened (RET) and/ or Schedule-I species' (under the *Wild Life Protection Act, 1972*, as amended until 2022) occurrence and modelled potentially suitable habitat data – obtained as one (1) sq.km square-shaped grids – from within the Ranthambhore landscape (Jhala *et al*., 2020, 2021). We also include information on an important Schedule-I and locally rare species for the landscape, the Caracal's (modelled) suitable habitat from Jangid *et al*. (2022). We also obtained additional information on tiger and caracal occurrence in the Ranthambhore landscape through RJFD field offices and extracted 1 sq.km grids around them, designating them as tiger and caracal occurrence grids. RJFD also provided us with kml polygon files of critical wildlife corridors in the larger Ranthambhore landscape. We also delineate a legally-valid (as on date of submission) Eco-sensitive Zone (ESZ) – both overall and within CISA – for three PAs in the Ranthambhore landscape concerning this assessment, namely RTR, Ramgarh-Vishdhari Tiger Reserve (RVTR) and National Chambal Sanctuary Project, Rajasthan (NCSP).

Using all the above wildlife-related, ESZ and PA data, we classify areas within the CISA into *critical* and *non-critical* zones with respect to threatened terrestrial mammalian wildlife distribution and forest connectivity. We present an overall and a few location-specific maps visualising mining leases within the CISA over the delineated critical and non-critical zones. We also briefly analyse the various state- and national-level policies related to mining activities. We prescribe a set of recommendations and scientific studies that need to be carried out in and around RTR towards generating better information on threats to wildlife populations and to wildlife/ forest connectivity in the region from mining and allied activities, and towards better regulation of the same in and around RTR.

1.4 Methodology

We created a 10 km-radius width buffer around Ranthambhore Tiger Reserve using its outer boundary GIS file as provided by the RJFD, whose area (not including RTR) totalled 4,362.42 sq.km. However, this included areas in the adjoining Sheopur district of Madhya Pradesh as well. Since the present assignment is limited to the state of Rajasthan, the final Cumulative Impact Study Area (or CISA) – excluding an area of around 564.32 sq.km in Madhya Pradesh – totalled **3,798.10 sq.km** (Figure 1).

For the finalised CISA, we then used relevant data regarding the presence, occupancy, modelled suitable habitat and wildlife movement corridors of select RET and/ or Schedule-I (under the *Wild Life Protection Act, 1972*) large mammalian species such as tiger *Panthera tigris*, leopard *Panthera pardus*, caracal *Caracal caracal*, wolf *Canis lupus pallipes*, dhole *Cuon alpinus*, sloth bear *Melursus ursinus* and Indian pangolin *Manis crassicaudata* from the Tiger Cell at WII and through field offices of the RJFD (communicated over email post WII field visit and interactions). Such data is usually collected and/ or generated during and as a result of the All India Tiger Estimation (AITE) exercises executed every four years by the MoEF&CC through the National Tiger Conservation Authority (NTCA) and WII (Jhala *et al*., 2020, 2021), or when carrying out other research and monitoring activities in the given landscape. Caracal *Caracal caracal* modelled suitable habitat and occurrence locations within the CISA were also additionally obtained from Jangid *et al*. (2022). The modelled suitable habitat data for the aforementioned RET species have been provided in the form of high-resolution 1 sq.km grids.

We obtained KML polygon files from the RJFD of the proposed Eco-sensitive Zones (ESZ) of RTR and RVTR (not yet notified by the MoEF&CC pending essential information and clarification from the RJFD). In the absence of any proposed ESZ for NCSP, Rajasthan, we delineated a legally valid ESZ for the same following the Supreme Court of India's June 2022 Order in W.P. (Civil) no. 202 of 1995 (*T.N. Godavarman Thirumulpad Vs. Union of India & others*) (refer point 44b on Order page no. 54, and point 44h on Order page no. 57) and following MoEF&CC's relevant guidelines and directions on the matter (Figure 2). Accordingly, the legally valid ESZ for the NCSP, Rajasthan (as on the date of submission of this Report) comprises of the proposed RVTR's ESZ (with an NCSP component as RVTR's "NCSP core") and the default 10 km-radius width around NCSP along the rest of its stretch. ***All existing and new commercial major/ minor mineral mining are prohibited in all ESZs, as per rules and guidelines currently in force.*** From the information within CISA on RET large mammalian species' occupancy, wildlife movement corridors, Protected Areas themselves and their respective ESZs, a total "*critical zone*" for wildlife conservation – within which mining and associated activities may be deleterious for the landscape's wildlife, biodiversity and ecosystems – is delineated.

We describe and highlight some of the various effects that mining and associated industries exert on ecosystems, biodiversity and on socio-environmental aspects using available literature on the subject and drawing inferences from certain case studies. We also analyse existing Union and State policies and guidelines concerning mining and mention important Orders and Judgements of Hon'ble higher courts of judicature in this context. Derived from our understanding of the various mining related laws, rules, procedures and guidelines, we also

briefly analyse the two (02) proposals under the SC-NBWL's consideration for improvements in terms of information supplied. Using point geo-coordinates information of a total of 145 mining leases (operational/ legal statuses unknown) supplied by various district offices of the Department of Mines & Geology, Govt. of Rajasthan on WII's request facilitated by the RJFD, we overlaid these on the "*critical zone*" for wildlife delineated as a result of this assessment/ study. We supply this information in the form of a table for further necessary action, as deemed feasible, by the concerned governing and regulating authorities at the Union and State levels.

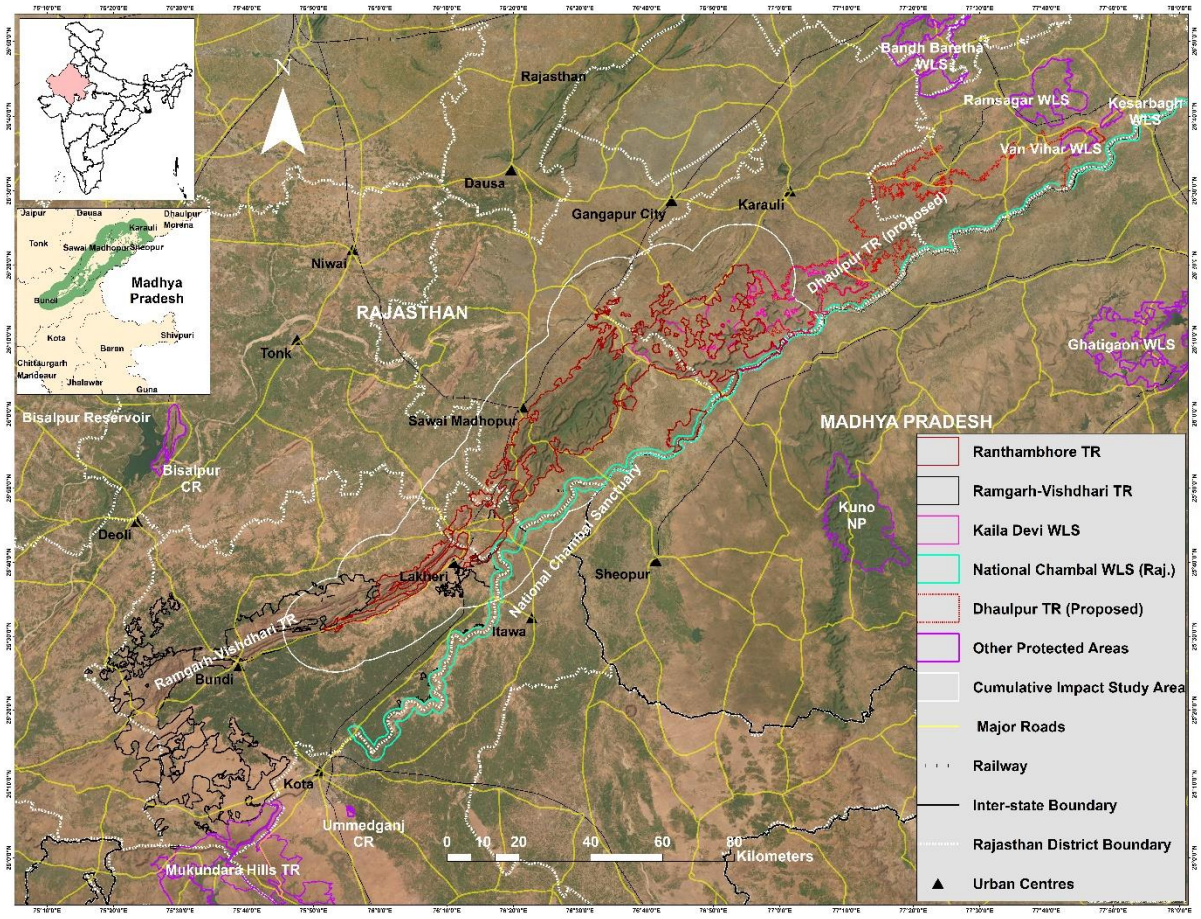

Figure 1: Ranthambhore Tiger Reserve (RTR) and the finalised 10 km-radius width Cumulative Impact Study Area (or "*CISA*") within Rajasthan with district boundaries; adjoining Protected Areas in the larger landscape including the proposed Dhaulpur Tiger Reserve is also depicted

We also conducted a rapid one-day field visit on February 07, 2023 to the two proposed mining sites awaiting NBWL appraisal within Karauli district to understand the field situation, and thereafter interacted with various stakeholders during the said field visit until February 11, 2023. Our learnings and analyses inform our various recommendations to better and more sustainably regulate mining activities to protect native biodiversity in the State, and ensure wildlife persistence and connectivity in the larger Ranthambhore landscape.

2. CUMULATIVE IMPACT STUDY AREA (CISA)

2.1 General description

The CISA comprises parts of nine (09) Forest Divisions around RTR – *RTR-I, RTR-II, RVTR, NCSP, Karauli SFD, Sawai Madhopur SFD, Tonk SFD, Bundi SFD and Kota SFD*. The CISA is formed by parts of five (05) administrative districts within Rajasthan, namely Karauli, Sawai Madhopur, Tonk, Bundi and Kota. Forest Division-wise and administrative district-wise breakdowns of areas within the CISA are shown in Tables 1 and 2, respectively. The CISA is also shown in Figure 1 for reference. The five (05) administrative districts that partly lie within the CISA are described below in terms of their general geography, climate, population, ecosystems, flora, fauna and mineral resources.

Sr. no.	Forest Division	Area (sq.km) within CISA	Area (%) within CISA
1	RTR-I	15.620	0.411
2	RTR-II	171.260	4.509
3	RVTR	286.850	7.552
4	NCSP	130.897	3.446
5	Karauli SFD	174.680	4.599
6	Sawai Madhopur SFD	18.440	0.486
7	Tonk SFD	15.430	0.406
8	Bundi SFD	97.450	2.566
9	Kota SFD	20.530	0.541
Non Forest (Revenue/ Agricultural/ Other) Land		2866.944	75.484
TOTAL		**3798.100**	**100**

Table 1: Forest Division-wise breakdown of the Cumulative Impact Study Area (CISA); *SFD* = Social Forestry Division which may also be known/ referred to as Territorial (T) Division

Sr. no.	District	Population (as per Census of India Report, 2011)	Population (2023 projected)	Total Area (sq.km)	Area (sq.km) within CISA	Area (%) within CISA
1	Karauli	14,58,248	16,91,276	5524.00	864.331	22.899
2	Sawai Madhopur	13,35,551	15,48,972	4498.00	1345.750	35.653
3	Tonk	14,21,326	16,48,454	7194.00	140.260	3.716
4	Bundi	11,10,906	12,88,429	5776.00	1088.490	28.838
5	Kota	19,51,014	22,62,786	5217.00	335.730	8.895
TOTAL					**3774.561**	**100**

Table 2: District-wise breakdown of the Cumulative Impact Study Area (CISA) with human population figures (2011 actual, and 2023 projected); *note that slight differences in total areas might reflect gaps present in GIS data obtained from different sources*

Sr. no.	Major settlements within Holistic Plan Area	Settlement type	District	Population (as per Census of India Report, 2011)	Population (2023 projected)
1	Sawai Madhopur	Urban	Sawai Madhopur	1,21,106	1,65,000
2	Khandar	Rural	Sawai Madhopur	12,273	14,973
3	Dei	Rural	Bundi	12,884	15,718
4	Lakheri	Rural	Bundi	29,572	40,000

Table 3: Major population centres located within the Cumulative Impact Study Area (CISA) with human population figures (2011 actuals, and 2023 projected)

i. Karauli

Karauli district is located in the eastern part of Rajasthan. It is surrounded by Bharatpur and Dholpur districts in the north, Sawai Madhopur district in the south, Dausa district in the east and Sheopur district of Madhya Pradesh state in the west. According to DMG (2019), the district is situated between 26˚01'27.02" to 27˚00'11.61" north latitude and 76˚28'34.98" to 77˚24'12.00" east longitude. This district is a part of four river basins namely Gambhir, Banas, Chambal and Parbati (CGWB, 2013b). Administratively, it is divided into 5 blocks namely Hindaun, Todabhim, Sapotara, Nadoti and Karauli. Geographically, the district is divided into three areas viz. Dang, Hilly and Plainland areas. Karauli is a significant district especially for its mineral reserves, mainly found in areas of Mandrayal village, Masalpur village, Sapotara town, Todabhim and Hindaun cities. Two such major minerals are silica stone and sandstone which are used in glass manufacturing for vehicles and construction of buildings, respectively (DMG, 2019).

The district covers a total geographical area of 5,524 sq.km, of which around 864.331 sq.km lies within the CISA. The district's total forest cover is estimated at 843.84 sq.km (15.28%) by Forest Survey of India (2021) in its latest India State of Forest (ISFR) report. The change in forest cover area with respect to ISFR 2019 assessment was found to be negative 26.16 sq.km indicating loss of forest cover. Total scrub cover in Karauli is however 300.54 sq.km. The last official Census of India (2011) exercise documented the district population at 14,58,248 with a relatively low (than national average) population density of 264 persons per sq.km. The district has a semi-arid climate with very cold winters and hot summers, and witnesses generally poor rainfall during south-west monsoon period (June-September). In May and June, the maximum temperature may go up to 48˚C. The average annual rainfall of Karauli is 559 mm with relative humidity of over 60% during the south-west monsoon season whereas during the rest of the year, the air remains very dry. Summer is the driest season during which the afternoon relative humidity can be as low as 10% to 15% (DMG, 2019).

The main forest type of the district is tropical dry deciduous forest, dominated by Dhonk/ Dhok *Anogeissus pendula* forest. Other vegetation types found in this district are degraded *Anogeissus pendula* series, *Acacia leucophloea–Capparis decidua* series, grasslands and *Acacia senegal–Maytenus emarginatus* series. The main tribe living in Karauli is Meena while other traditional communities include Gurjar, Mali, Jogi, Mogya etc. They mainly live in different hilly and forested tracts of the district. These tribes still use local flora for their daily needs. Around 26 plants species including plants like *Acacia leucophloea, Actiniopteris*

radiata, Bauhinia racemosa and Cocculus pendulus are collected and used by tribal population and traditional communities, especially for their medicinal properties. Natives from Karauli district also use natural fibre yielding plants that include around 32 plant species belonging to 16 families such as *Abelmoschus esculentus, Acacia nilotica, Corchorus olitorius, Sesbania sesban* etc (Sharma, 2015). Many plants are also used to treat veterinary diseases such as *Abrus precatorius, Acacia leucophloea, Amaranthus tricolor, Balanites aegyptiaca, Boerhavia diffusa, Calotropis gigantia, Cassia tora* and many others.

Given that every tribal community in the district rear animals such as goat, sheep, buffaloes, cows, camels, dog and donkey, they use more than 70 plant species to treat these domestic animals. Such plants include *Acacia nilotica, Annona squamosa, Ziziphus mauritiana, Melia azedarach* to name a few (Meena & Kumar, 2015). According to a wildlife animal census conducted by the Rajasthan Forest Department through the waterhole method in 2020, Karauli district (forested tracts outside PAs) recorded the presence of 834 jackal, 751 nilgai, 163 blackbuck, 133 wild pig, 63 striped hyaena, 33 Indian wolf, 13 Indian gazelle, 33 desert fox, 13 civets, ten (10) jungle cat, 26 Indian porcupine and four (04) leopard individuals.

ii. Sawai Madhopur

Sawai Madhopur district of Rajasthan is situated in the eastern part of the state, between 25° 44'00.90" to 26° 43' 34.33" north latitude and 75° 58' 36.70'' to 76° 59' 04.98'' east longitude. The district is part of three river basins namely Banas, Chambal and Gambhir river basins (CGWB, 2013d). The district covers a total geographical area of 4,498 sq.km, of which around 1,346 sq.km around RTR to its west lies within the CISA. The district is surrounded by Sheopur district of Madhya Pradesh in the east, Tonk district in the west, Dausa and Karauli districts in north and Kota district in the south. According to the 2011 Census of India Report, the district has a total population of 13,35,551 with a population density of 297 persons per sq.km, and a total decadal (2001-11) growth rate registered as 19.56%. Administratively, the district is divided into 5 blocks namely Bamanwas, Bonli, Gangapur, Khandar and Sawai Madhopur.

The area has a sub-humid climate with temperature range from 4˚C to 45˚C and average annual rainfall of 606.6 mm, where most of the rainfall is received during the south-west monsoon period (CGWB, 2013d). Forest Survey of India's ISFR 2021 report states the total forest cover area of Sawai Madhopur district as 464.61 sq.km (10.33% of its total geographical area). The change in forest cover area with respect to 2019 assessment is (positive) 1.92 sq.km. In addition, the total scrub cover area of the district is 138.52 sq.km. The biodiversity rich Chambal River in Khandar tehsil forms the natural boundary between Rajasthan and Madhya Pradesh states. There are also many freshwater ponds, dams and lakes in the area where a good diversity of diatoms (freshwater algae that are major contributors of oxygen) are present, such as *Synedra laevigata, Eunotia bigibba, Eunotia monodon* etc (Meena, 2020). Geographically, the district is divided into three physiographic units – hilly terrain (S and SE part with NE-SW trending ridges), alluvial plain with isolated hills (SW and central part) and alluvial plains with relatively flat and gently sloping topography (N, NE and W parts of the district) (CGWB 2013d). The Aravalli hills occur in the north-western and southern parts of the district. Banas, Chambal and Morel rivers are the major rivers flowing within Sawai Madhopur district. No part of the district falls in the desert category with absence of any naturally occurring springs (District Census Handbook, Sawai Madhopur, 2011). In addition, the district holds many

mineral resources, such as lead, copper and iron ore (metallic minerals) whereas non-metallic minerals comprise limestone, clays, silica sand and talcum. There are also diverse rocks found in the district, suitable for use as building and decorative stones (District Census Handbook, Sawai Madhopur, 2011).

Being an eastern district of Rajasthan, Sawai Madhopur has mixed miscellaneous forest type comprising of main tree species such as *Anogeissus pendula, Anogeissus latifolia, Terminalia tomentosa, Terminalia arjuna, Terminalia chebula, Albizia lebbeck* and *Dalbergia paniculata.* These trees meet the local demands towards different resources such as firewood, charcoal, medicinal herbs, flowers, grass and grazing, fencing and thatching material, bamboo, honey, wax, kallia, karanj and other minor forest produce (Rajasthan Forest Department, 2023). According to a wildlife animal census conducted by the Rajasthan Forest Department through the waterhole count method in 2020, Sawai Madhopur district (forested tracts outside PAs) recorded the presence of 458 nilgai, 380 jackal, 54 wild pig, 52 striped hyaena, 46 desert fox, 39 Indian wolf, 20 jungle cat, one (01) Indian porcupine and five (05) leopard individuals.

iii. Tonk

Tonk district is situated in north-eastern Rajasthan, between 25° 40' 31.58" to 26° 33' 51.29" north latitude and 75° 06' 46.84'' to 76° 19' 38.24'' east longitude (CGWB, 2013e). It is surrounded by Sawai Madhopur and Kota districts in the east, Ajmer district in the west, Jaipur and Dausa districts in the north, and Bundi and Bhilwara districts in the south. The total area of the district is 7,194 sq.km, of which only 140.26 sq.km lies within the CISA. According to the 2011 Census of India Report, the total population of the district was 14,21,326 with a population density of 198 persons per sq.km. Tonk has a semi-arid climate where it is generally dry except during the south-west monsoon season (i.e. around third week of June to the middle of September). The average annual rainfall (2001 to 2010) has been measured as 531 mm, although it varies from 460.2 mm annual rainfall recorded at Malpura block to 590.04 mm recorded at Tonk block (CGWB, 2013e).

Administratively, Tonk district is divided into eight sub-divisions headquartered at Tonk, Newai, Malpura, Uniara, Deoli, Dooni, Todaraisingh and Peeplu. Geographically, the district is classified into four geomorphic units namely ridge & valley, structural hill, sand sheet and pediment/ pediplain surfaces (DMG, 2018). According to Forest Survey of India's latest ISFR 2021 assessment, the total forest cover of the district is 165.90 sq.km or only 2.31% of the district's entire geographical area. The change in forest cover area with respect to 2019 assessment was found to be (positive) 0.84 sq.km. The forest types within the district includes deciduous forest, forest plantations as well as scrub forest.

The district also holds good mineral potential producing mineral resources such as silica sand, masonry stone, mica, and alusite, corundum, soapstone, building stones, limestone, marble, serpentine, granite, asbestos (amphibole type), dolomite, phyllite-schist, pyrophillite, garnet, feldspar and sand (DMG, 2018). According to a wildlife animal census conducted by the Rajasthan Forest Department through the waterhole count method in 2020, Tonk district (forested tracts outside PAs) recorded the presence of 1733 nilgai, 786 jackal, 98 desert fox, 52 blackbuck, 59 sambar, 53 Indian gazelle, 42 Indian wolf, 42 striped hyaena, 34 jungle cat, 40 wild pig, one (01) civet and 24 Indian porcupine.

iv. Bundi

Bundi district is located in the south-eastern part of Rajasthan, also called the Hadoti region, which lies between Malwa plateau in the east, Aravali range in the west and Marwar plateau in the south-west (Singh *et al*., 2022). The district is bounded by Kota district in the east, Bhilwara district in the west, Tonk district in the north and Rawatbhata city of Chittorgarh district in the south. It spreads between 24°59'11" to 25°53'11" north latitude and 75°19'30" to 76°19'30" east longitude (DMG, 2016a). According to the 2011 Census of India report, Bundi district recorded a population of 11,10,906 with a population density of 192 persons per sq.km. Administratively, Bundi is divided into five blocks namely Bundi, Hindoli, Keshorai Patan, Nainwa and Talera. With respect to climate, Bundi has a dry/sub-humid climate where summer season occurs from March to May, with maximum temperature of 46ºC and above. Winter starts from November till February where minimum temperature recorded is around 3-4ºC. Monsoon occurs from July to early September. Average annual rainfall in the district is about 585.0mm (CGWB, 2013a).

The district has a total geographical area of 5,776 sq.km, of which 564.35 sq.km (9.77%) consists of forests, as assessed in ISFR 2021 by Forest Survey of India. The change in forest cover area with respect to 2019 assessment was (positive) 7.17 sq.km. Out of Bundi's total geographical area, 1088.490 sq.km lies within the CISA. The soil of Hadoti region is alluvial which is rich and fertile (Singh *et al*., 2022). Geographically, Bundi has prominent Vindhyan hill ranges through the district (northeast to southwest). Scattered ridges are also present in its northwestern part, whereas the southeastern part of the district is almost flat. The major river in the district is the Chambal River. It forms the boundary between Bundi and Kota districts. The major basin in Bundi is Chambal basin with its tributaries. A small part of the district in the north is also drained by tributaries of Banas River (CGWB, 2013a).

According to Singh *et al*. (2022), the district – being a part of Hadoti region – has a rich floral diversity with 51 total forest tree species belonging to different families. Few of such trees are Kachnar *Bauhinia variegata*, Bargad *Ficus benghalensis*, Pipal *Ficus religiosa*, Kanju *Flacourtia indica*, Safeda *Eucalyptus globulus*, Dhonk *Anogeissus pendula*, Jamun *Syzygium cumini*, Gulmohar *Delonix regia*, Imli *Tamarindus indicus* etc. These tree species are used by local tribal communities to cure various diseases such as diarrhoea, tuberculosis, joint pains, malaria, skin diseases etc. Tribal communities living in this region are Sahariya, Bhil, Kanjar, Sansis, Gadia Lohar, Mogya etc (Singh *et al*., 2022). Eleven (11) species of ferns and fern allies are also used for various ethno-botanical purposes. These species include Hans-raj *Adiantum incisum*, Morpankhi *Actinopteris radiata*, Jasumba *Pteris vittata* among others (Sharma, 2002).

Major mineral resources found in the district are limestone and sandstone. Other important minerals include sand, marble, granite, sandstone, iron, barites, slate stone, clay and silica sand. Silica sand used in the glass industry is found near Barodiya village in Bundi district (DMG, 2016a). According to a wildlife animal census conducted by the Rajasthan Forest Department through the waterhole count method in 2020, Bundi district (forested tracts outside PAs) recorded the presence of 1166 nilgai, 220 common langur, 176 jackal, 153 wild pig, 55 Indian gazelle, 13 civets, 10 chital/ spotted deer, 11 blackbuck, 5 Indian porcupine, 13 desert fox, 14 striped hyaena, 15 Indian wolf, 24 jungle cat, three (03) leopard, and one (01) sloth bear.

v. Kota

Kota district is located in the south-eastern part of Rajasthan state (Hadoti region). It is surrounded by Baran district in the east, Bundi and Chittorgarh districts in the west, Sawai Madhopur and Tonk districts in the north and Jhalawar district in the south. It is present between 24° 32' 02.17" to 25° 51' 19.33" north latitude and 75° 36' 55.19'' to 76° 34' 57.10'' east longitude, while the whole district is part of the Chambal river basin. Administratively, the district is divided into 5 blocks namely Itawa, Khairabad, Ladpura, Sangod and Sultanpur (CGWB, 2013c). The district's total geographical area is 5,217 sq.km, of which 335.73 sq.km lies within the CISA. The district has a recorded population of 19,51,014 as assessed during the last Census of India (2011) enumeration exercise with a population density of 374 persons per sq.km. Kota experiences a semi-arid climate where summer is long, starting in early March and lasting until late June during which it is generally hot and dry. The south-west monsoon winds bring rain June onwards until late September during which the temperature decreases yet humidity increases. The average annual rainfall in the district is 707.7 mm (CGWB, 2013c). Winter season is brief starting from late November until the end of February during which minimum temperatures may hover around the 5-10 degrees Celsius mark.

According to Forest Survey of India's ISFR 2021 assessment, Kota district has a total forest cover area of 544.83 sq.km, which is 10.44% of its total geographical area. The change in forest cover area with respect to 2019 assessment is (negative) 1.90 sq.km. Being a part of Hadoti region, the district has a rich floral diversity with a total of 51 forest tree species belonging to different families. Few of such trees are Kachnar *Bauhinia variegata*, Bargad *Ficus benghalensis*, Pipal *Ficus religiosa*, Kanju *Flacourtia indica*, Safeda *Eucalyptus globulus*, Dhonk *Anogeissus pendula*, Jamun *Syzygium cumini*, Gulmohar *Delonix regia*, Imli *Tamarindus indicus* etc. These tree species are used by the tribal communities living in the region to cure various diseases such as diarrhoea, tuberculosis, joint pains, malaria, skin diseases etc. (Singh *et al*., 2022). The tribal communities living in the district are Sahariya, Bhil, Kanjar, Sansis, Gadia Lohar, Mogya etc.

Major geographical units in the area are soil and alluvium, sand stone and lime stone. Major drainages are Chambal basin, Kalisindh and Parvati and its tributaries. Although metamorphic rocks associated to metallic minerals are totally absent in the area, the district has good deposits of limestone (for cement making), sandstone, silica sand, masonry stone, red ochre and bajari which is mainly mined out from the tributaries of Chambal river such as Kalisindh, Parwan and Ujad rivers (DMG, 2016b). According to a wildlife animal census conducted by the Rajasthan Forest Department through the waterhole count method in 2020, Kota district (forested tracts outside PAs) recorded the presence of 526 nilgai, 258 wild pig, 247 jackal, 235 common langur, 220 blackbuck, 48 Indian gazelle, three (03) civets, six (06) Indian wolf, five (05) chital, seven (07) jungle cat, nine (09) striped hyaena, and 18 desert fox individuals.

2.2 Geology, Geomorphology, Elevation and Slope

Geospatial layers are essential for Environmental Impact Assessments, particularly since these layers help to understand critical structural aspects of the landscape. We depict the CISA and the larger Ranthambhore landscape below in Figures 2-5 in terms of its geology, gemorphology, elevation (digital elevation model) and slope. Relevant data regarding geology

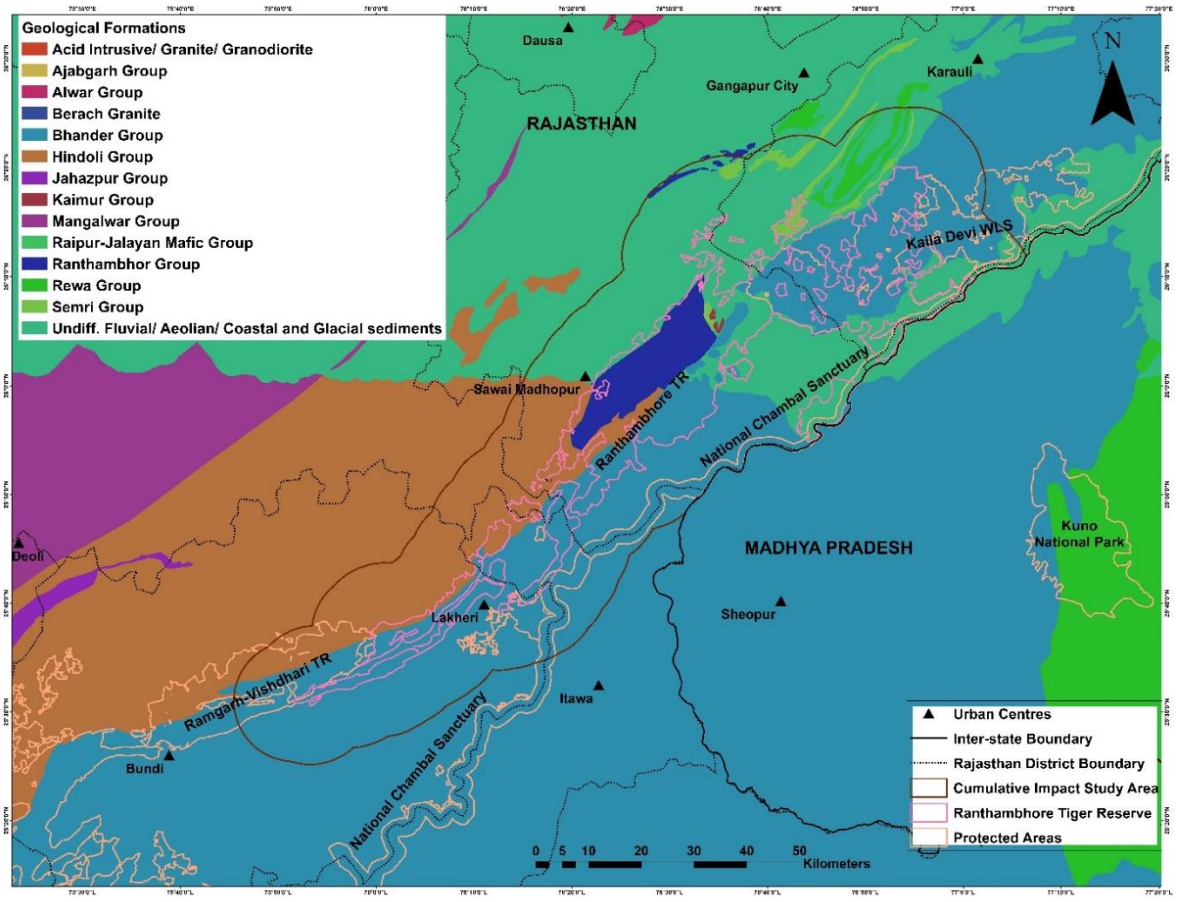

Figure 2: Major Geological Formations within the CISA and the larger Ranthambhore landscape

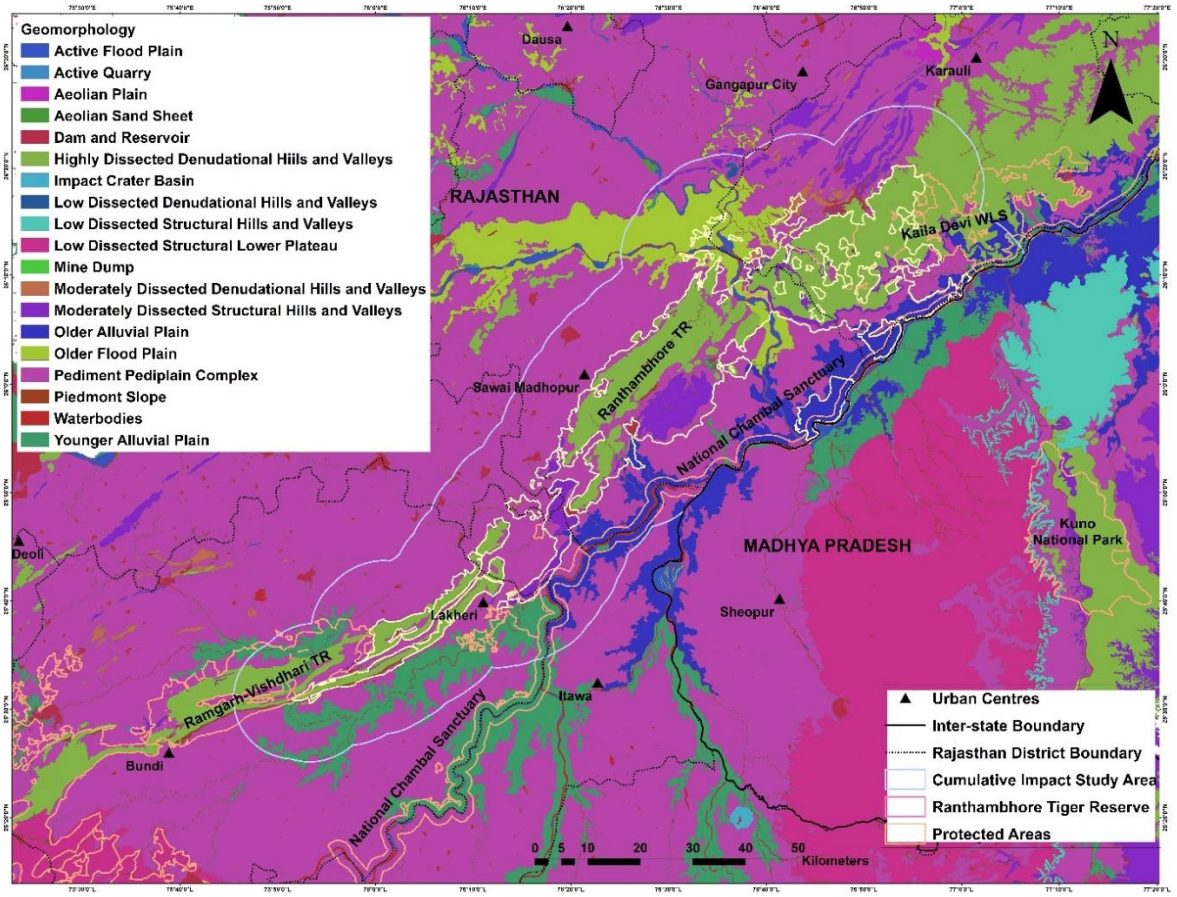

Figure 3: Geomorphology classes within the CISA and the larger Ranthambhore landscape

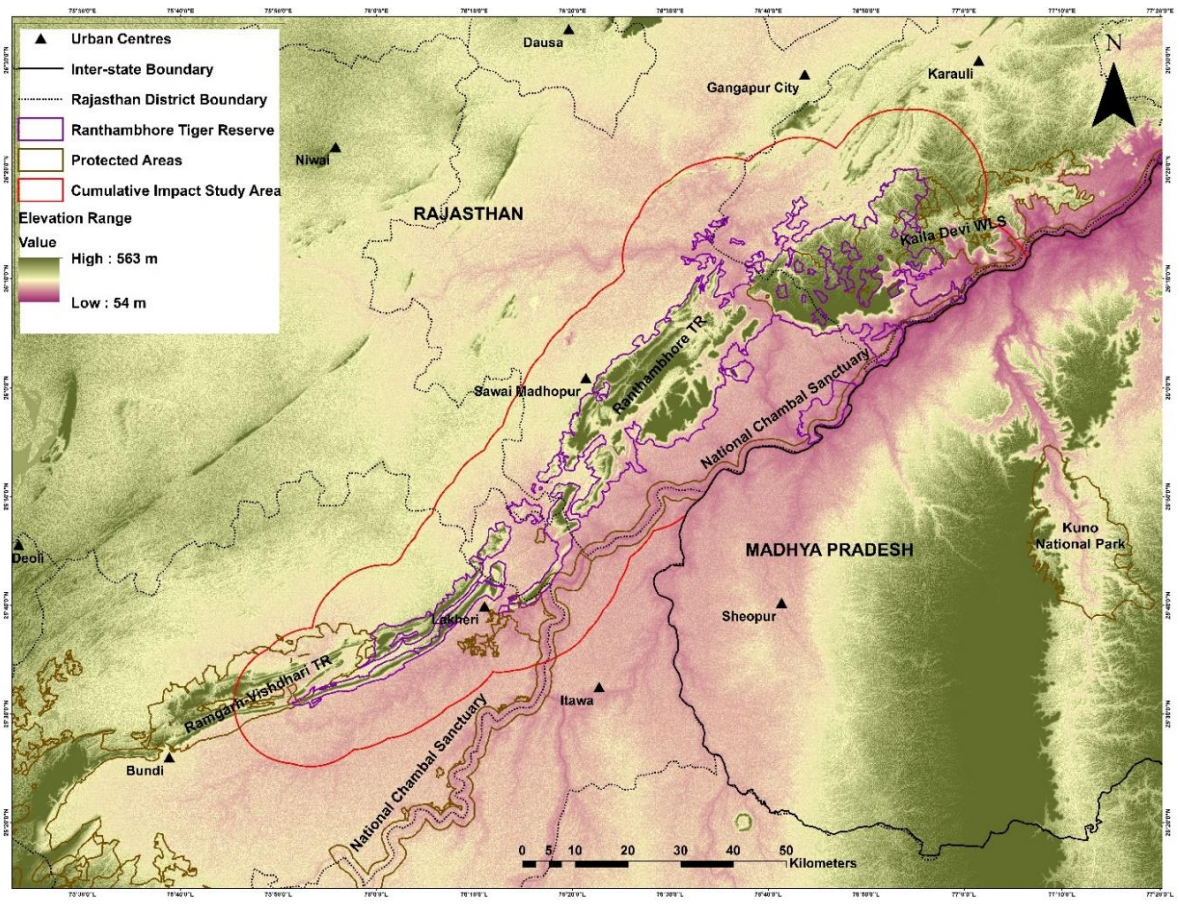

Figure 4: Digital Elevation Model (DEM) of the CISA and the larger Ranthambhore landscape

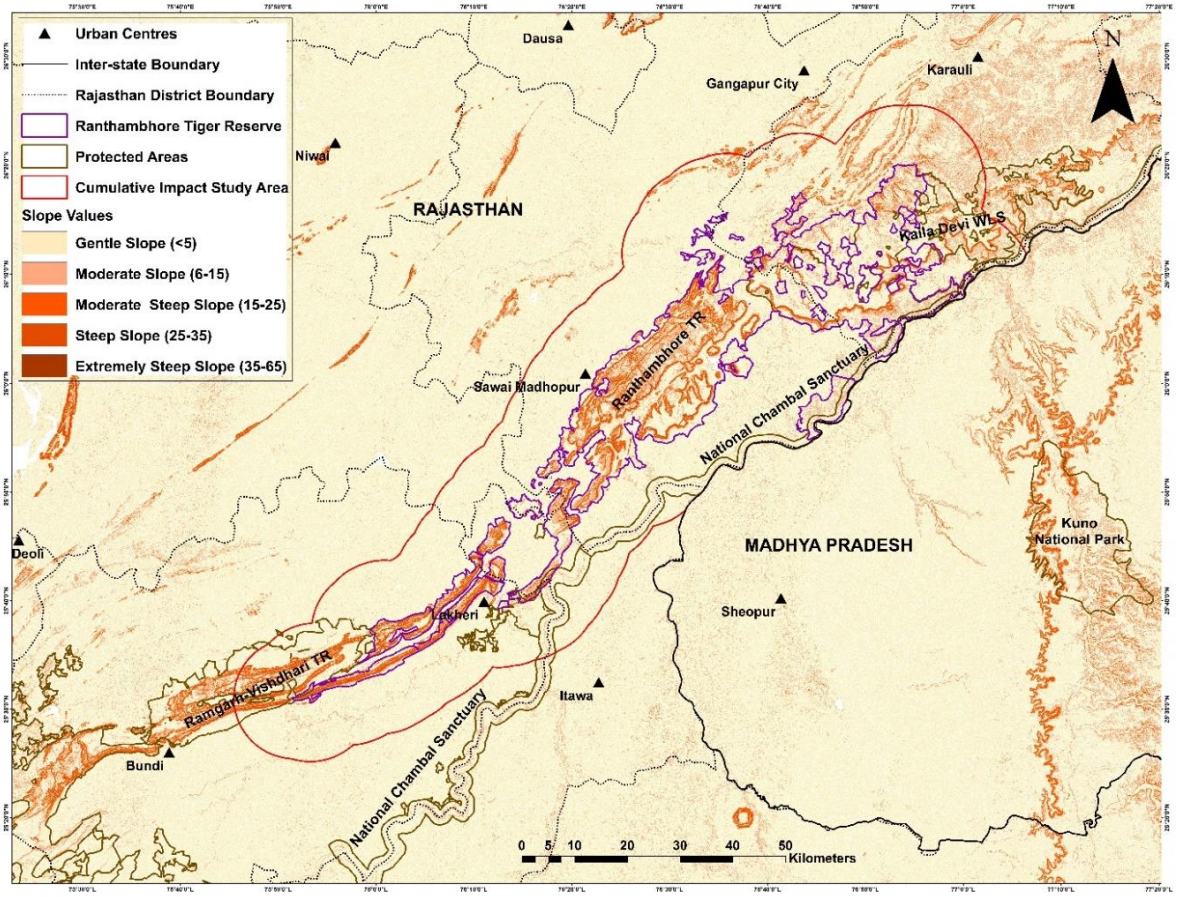

Figure 5: Slope profile of the CISA and the larger Ranthambhore landscape

and geomorphology was downloaded from Geological Survey of India's (GSI) web portal. A digital elevation model (DEM) is a 3D representation of a terrain's surface created from terrain elevation data. DEM reflects the physical surface of the Earth and helps understand the nature of the terrain. The DEM data was downloaded from the USGS website (www.earthexplorer.usgs.gov) and then processed in ArcMap 10.6. The dataset has been sink-filled, appropriately clipped, and depicted as a gradient. Similarly, the slope too is a very important aspect of any region since it shows the undulating surface/ nature of the area. For our purposes, we have classified the region's slope into four categories – gentle slope, moderate slope, moderately steep slope, steep slope and extremely steep slope. Slope values were computed through the DEM data as processed in ArcMap 10.6.

2.3 Land Use/ Land Cover (LU/LC)

LU/LC classification is one of the most widely used applications in remote sensing. LU/LC maps have a prime role in planning, management and monitoring programs at local, regional and national levels (Tueller, 1989). LU/LC map for the Cumulative Impact Study Area (Figure 6) was prepared using ESRI Sentinel-2 10-metre resolution Land Use/ Land Cover Time Series (Mature Support) product (https://www.arcgis.com/home). The ESRI Sentinel-2 2021 LU/LC classes are water, flooded vegetation (riverbed shrubs, grass, bare ground), trees (vegetation), crops (agriculture), built area (built-up), bare ground (barren land), and rangeland (grassland, shrubs, savannahs with very sparse grasses, trees or other plants. We have combined water and flooded vegetation categories into one LU/LC class (water), based on visual inspection of satellite imagery and ground truthing, for our purposes in the context of the CISA.

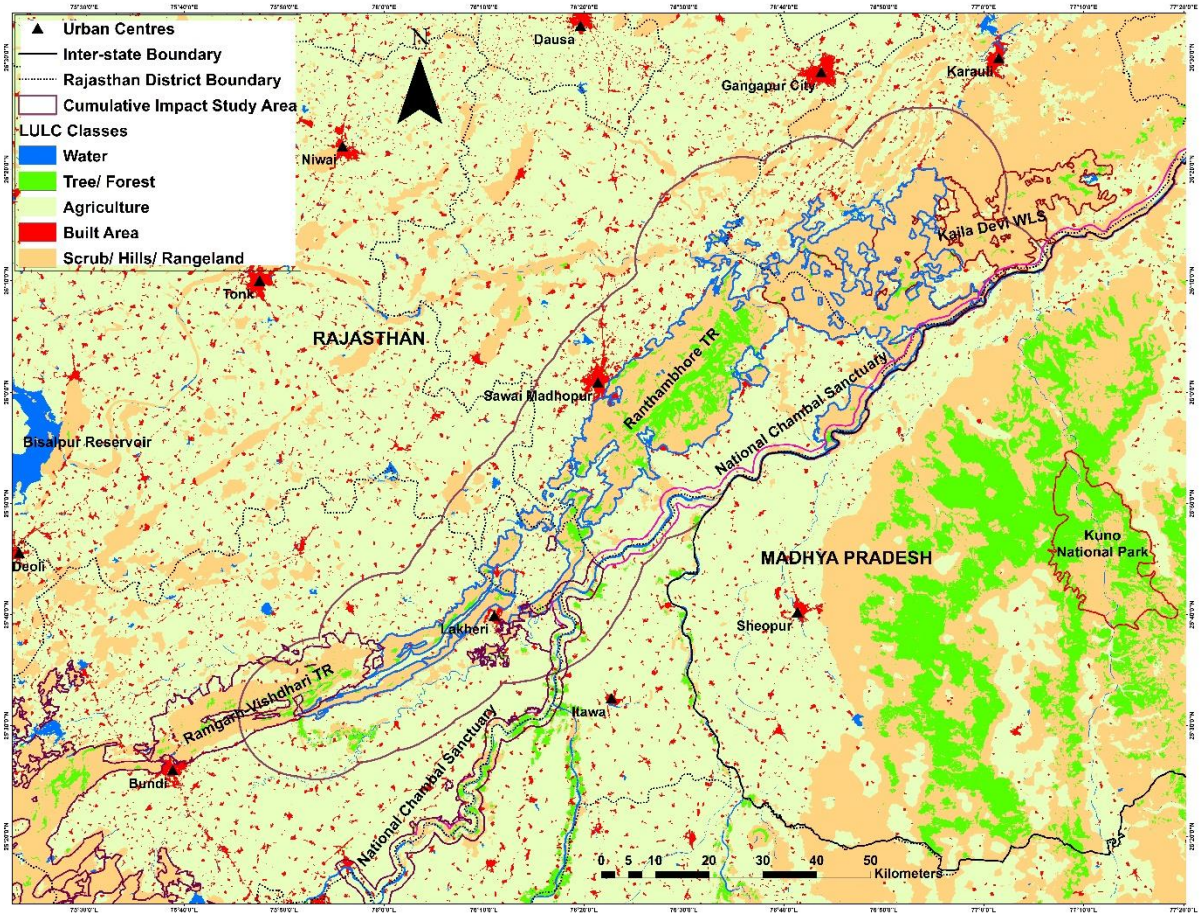

Figure 6: An overview of LU/LC within CISA and the larger Ranthambhore landscape

Sr. no.	LU/ LC category	Area (in sq.km) within CISA	Area (%) within CISA
1	Water & flooded vegetation	60.280	1.59
2	Bare Ground	8.230	0.22
3	Crops/ Agriculture	2614.050	68.83
4	Scrub/ Hills/ Rangeland	905.973	23.85
5	Trees/ Forest	50.970	1.34
6	Built Area	158.577	4.18
TOTAL		**3798.080**	**100.00**

Table 4: Land Use/ Land Cover extents in the c. 3,798 sq.km CISA only (not including RTR)

Agriculture/ cropland occupied the highest proportion of area within the CISA (68.83%), followed by Rangeland (23.85%), while Trees/ Forest covered a miniscule 1.34%. It must be noted though that the category 'Rangeland' are extensive natural and potentially biodiversity-rich landscapes (also known as 'Open Natural Ecosystems', refer Madhusudan & Vanak, 2022) with the presence of evolutionarily distinct, uniquely adapted species. The category includes important habitats such as grasslands, shrublands (bushes), woodlands, ravines, wetlands, and deserts. Rangeland, thus, may form very suitable habitats for animal groups such as ungulates, small carnivores and a variety of birds for different life history purposes (Gautam, 2020).

2.4 Forest Type and Forest Cover

Forest type (Figure 7) and Forest cover (Figure 8) maps for the Cumulative Impact Study Area have been prepared using the Forest Survey of India's forest type (2009) and USGS's Landsat-8 raster datasets (by computing Normalised Difference Vegetation Index, or NDVI through Bands 4 and 5), respectively. Majority area within the CISA is classified as non-forest (88.62%), while in the remaining classified forested area, the major forest types include Northern Dry Mixed Deciduous Forest (6.74%), Dry Deciduous Scrub (3.52%), Khair Sissoo Forest (0.52%) etc., as per Champion & Seth (1968) (Table 5). Forest cover within the CISA is dominated by shrubland and grassland (39.15%), followed by sparse/ open vegetation/ forest (33.48%). Only 2.79% of the CISA comprises of dense forest vegetation – mostly in its south-western part constituting Ramgarh-Vishdhari WLS & TR (Table 6).

Sr. no.	Forest Type	Area (in sq.km) within CISA	Area (%) within CISA
1	5B/C2 Northern Dry Mixed Deciduous Forest	255.834	6.74
2	5/DS1 Dry Deciduous Scrub	133.607	3.52
3	5/E1 *Anogeissus pendula* Forest	2.206	0.06
4	5/E2 Boswellia Forest	0.972	0.03
5	5/E5 Butea Forest	3.398	0.09
6	5/1S2 Khair Sissoo Forest	19.848	0.52
7	Plantation/ TOF	12.639	0.33
8	Water	3.490	0.09
9	Non Forest	3364.950	88.62
TOTAL		**3796.944**	**100.00**

Table 5: Different forest types and their respective extents as available in the CISA (not including RTR); *slight differences in total areas reflect gaps in information from various GIS data sources*

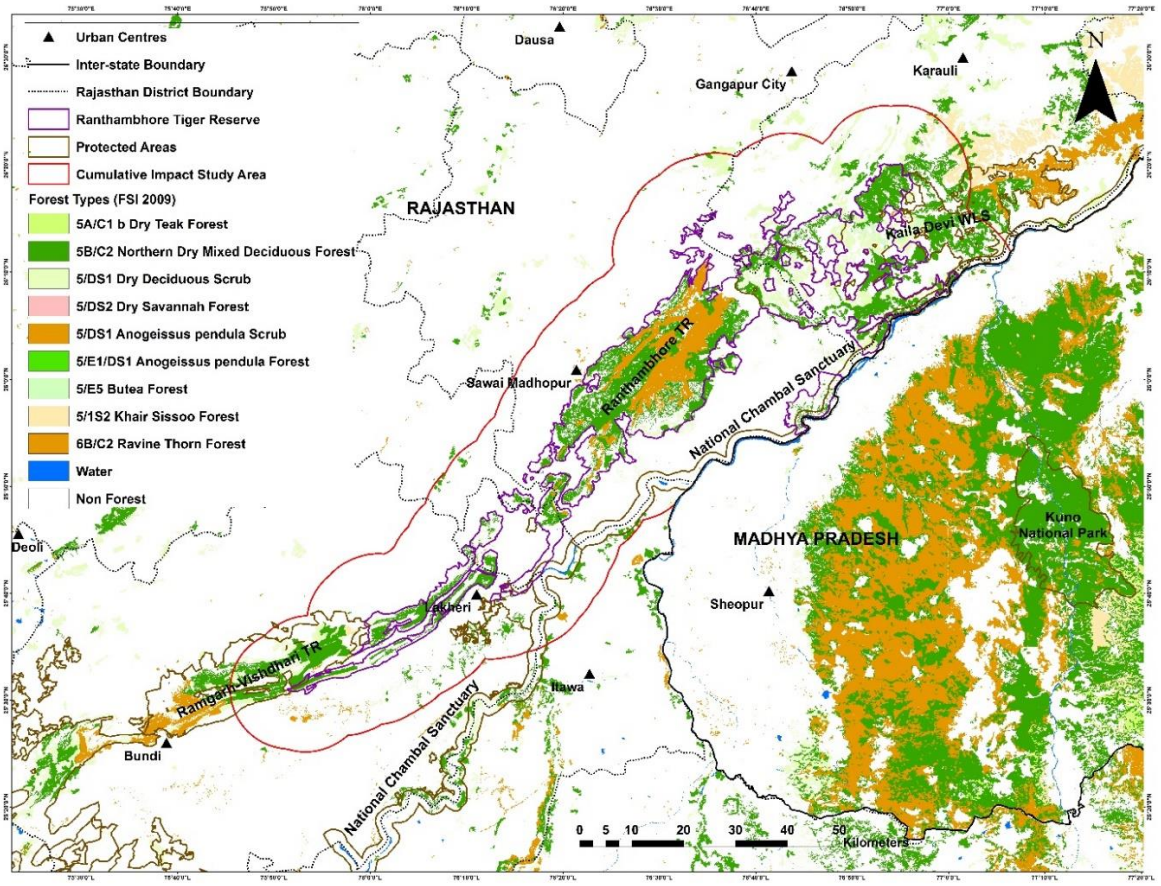

Figure 7: Forest types within the CISA and in the larger Ranthambhore landscape

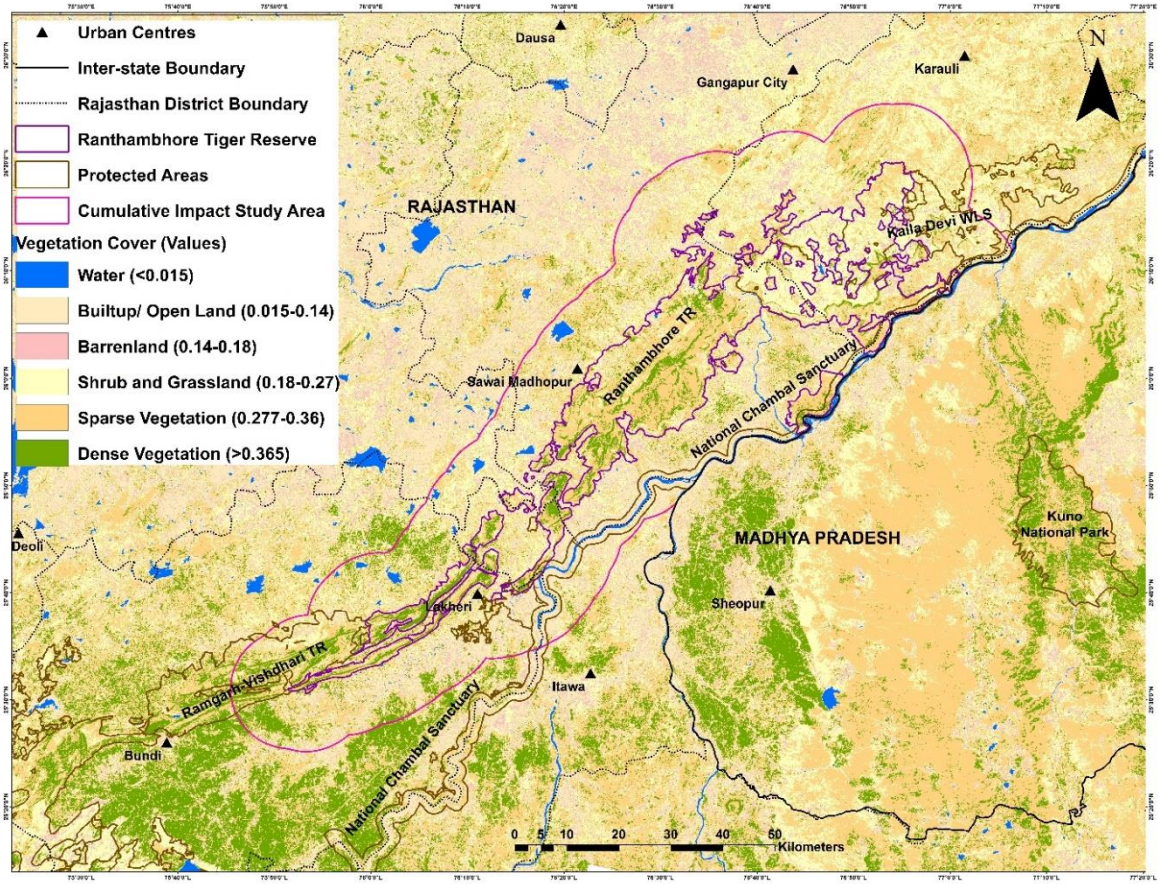

Figure 8: Forest cover within the CISA and in the larger Ranthambhore landscape with associated category-wise NDVI values (see legend)

Sr. no.	Forest Cover	Area (in sq.km) within CISA	Area (%) within CISA
1	Water	83.850	2.24
2	Built/ Open Land	491.840	13.12
3	Barren Land	345.580	9.22
4	Shrubland & Grassland	1467.190	39.15
5	Sparse Vegetation	1254.690	33.48
6	Dense Vegetation	104.577	2.79
TOTAL		**3747.727**	**100.00**

Table 6: Forest cover categories and their extents within CISA; ***note that slight differences in total areas reflect gaps in information from various GIS data sources***

2.5 Protected Area (PA) Coverage, Biodiversity Values & Eco-sensitive Zones (ESZs)

According to the latest biogeographic classification scheme by Rodgers and Panwar (1988), the CISA lies entirely within Zone 4B (Semi-Arid Gujarat Rajputana). Since the present assignment concerns the cumulative impact/ holistic study of a 10 km-radius width around Ranthambhore Tiger Reserve within Rajasthan, RTR itself is not part of the c. 3,798 sq.km CISA. However, since RTR is the nucleus around which this report has been drafted, a brief description of its biodiversity is in order. Besides RTR, the CISA also consists parts of three other protected areas (PAs) namely Kaila Devi WLS, Ramgarh-Vishdhari WLS & TR and National Chambal Sanctuary Project, Rajasthan. Apart from these, some of the other neighbouring PAs around RTR with wildlife connectivity between each other include Kuno NP (Madhya Pradesh) to the east, Mukundara Hills NP & TR to the south and south east, and Van Vihar WLS, Kesarbagh WLS, Ramsagar WLS, Bandh Baretha WLS to the north, up to even Keoladeo Ghana (or Bharatpur) NP (Figure 1, Table 7). Given below are brief descriptions of the biodiversity of RTR and the three aforementioned PAs within the CISA.

2.5.1 Protected Areas within CISA

i. Ranthambhore Tiger Reserve (RTR)

RTR is located in the south-eastern part of Rajasthan and is spread over four districts, namely Sawai Madhopur, Karauli, Bundi and Tonk. Ranthambhore TR is part of the western block of the central Indian landscape that includes Sariska Tiger Reserve, Kuno-Palpur WLS & Kuno NP, Madhav National Park, Ramgarh-Visdhari WLS & TR, and Mukundara Hills NP & TR (Jhala *et al*. 2020). According to RTR's Tiger Conservation Plan (TCP) (2022-23 to 2031-32) drafted by Yadav (undated), RTR has total geographical area of 1,411.284 sq.km, of which the core zone (critical tiger habitat) is 1,113.364 sq.km while the buffer zone is 297.92 sq.km (Yadav, undated). RTR is home to a diverse species of flora and fauna, with an estimated 38 species of mammals, 315 species of birds (both resident and migratory), 11 species of reptiles, 10 species of fishes and 402 species of plants (Yadav, undated).

In terms of faunal diversity, RTR shelters flagship species such as tiger *Panthera tigris*, leopard *Panthera pardus*, caracal *Caracal caracal*, desert cat (or Afro-Asiatic wildcat) *Felis lybica*, jungle cat *Felis chaus*, fishing cat *Prionailurus viverrinus*, striped hyaena *Hyena hyena*, jackal *Canis aureus*, sloth bear *Melursus ursinus* and the Indian fox *Vulpes bengalensis*. In addition, RTR also harbours major herbivore species at relatively good densities (in the RTR-I Division)

such as Chinkara *Gazella bennettii* (2.04/sq.km), Chital *Axis axis* (21.62/sq.km), nilgai *Boselaphus tragocamelus* (9.37/sq.km), Sambar *Rusa unicolor* (13.95/sq.km) (Jhala *et al*., 2020), besides others such as barking deer, gaur, wild pig etc. Other animals inhabiting the forests include the common langur *Semnopithecus entellus*, Indian crested porcupine *Hystrix indica*, civets, badgers, hares and a variety of snakes, three species of mongoose and marsh crocodile. RTR (Division I) harbours around 53 tigers with an estimated tiger density of 9.6 tigers/100 sq.km (Jhala *et al*., 2020).

RTR's forests comprises of two main types – tropical dry deciduous (944.63 sq.km) and tropical thorn forest type (6.49 sq.km). The tiger reserve also has a small plantation area of about 0.17 sq.km (FSI, 2021). It is representative of dry deciduous Dhonk *Anogeissus pendula* forest sub-type in association with *Acacia, Capparis, Zizyphus* and *Prosopis* species (Yadav, undated). Moreover, there is a good wetland distribution across the RTR area. These wetlands have rich floral and faunal diversity. The main wetland area of Ranthambhore TR are Padam Talao, Raj Bagh, Malik Talao, Kachida, Mansarovar, Gilaisagar etc. where floral species such as kamal, water lily, water hyacinth etc. are found (TCP 2022-23 to 2031-32). According to Shrivastava & Singh (2009), some rare plant species were also collected from RTR such as *Abutilon bidentatum*, *Tephrosia uniflora* and *Pergularia tomentosa*. Moreover, there are threatened crops plants from the area reported such as *Oryza rufipogon*, *Luffa acutangula* and *Cajanus scarabaeoides*. RTR is also the only habitat from where four taxa namely *Fimbristylis dipsacea*, *Pergularia tomentosa*, *Tephrosia uniflora* and *Abrus pulchellus* were collected.

ii. Ramgarh-Vishdhari Tiger Reserve (RVTR)

RVTR is situated in Bundi district in the south eastern part of Rajasthan state. It lies between 25°59'0" to 25°53'0" north latitude and 75°19'0" to 76°49'0" east longitude. The reserve represents both Aravali and Vindhyan ranges, having gentle slopes, steep rocky cliffs, flat hills, conical hillocks as well as sharp ridges. The reserve has a total notified geographical area of 1501.88 sq.km with 481.9 sq.km of core area and 1019.98 sq.km of buffer area (www.ntca.gov.in). One of the main tributaries of Chambal River – the Mej River – extends over four districts of Rajasthan, namely Bhilwara, Bundi, Tonk and Kota, with a length of 144 km forming an oval shaped basin over an area of 5,500 sq.km. This drainage system or basin of Mej River is shared by Ramgarh-Vishdhari WLS (part of RVTR core area) which is inhabited by a number of tribal, ethnic and nomadic communities such as Bhil, Meena, Kanjar, Sansi, Bhat, Mogya, Kalbeliya, Banjara among others (www.ntca.gov.in).

The forests of RVTR are dominated by Dhonk/ *Anogeissus pendula* (esp. within Ramgarh-Vishdhari WLS), followed by other forest types such as Khair *Acacia catechu*, Reonja *Acacia leucophloea*, Amaltas *Cassia fistula*, Gurjan *Lannea coromandelica*, Salai *Boswellia serrata*, Indian ghost tree *Sterculia urens*, Tendu *Diospyrous melanoxylon* etc. Undergrowth in the area comprises of *Ziziphus nummularia, Adhatoda vasica, Capparis separia, Grewia flavescens* etc. In addition, the ground cover involves grasses like *Apluda mutica, Aristida spp*., *Heteropogon contortus, Dicanthium annuatum* and *Cynodon dactylon* (www.ntca.gov.in).

In terms of faunal diversity, RVTR is home to animals such as jungle cat, golden jackal, striped hyaena, Indian crested porcupine, Indian hedgehog, rhesus macaque, common langur, small Indian civet, palm civet, Indian fox, ratel, ruddy mongoose, Indian hare, leopard and sloth bear.

Large herbivore species in the area include chital, sambar, nilgai and wild pig. The reserve also shelters a large number of herpetofauna such as Indian rock python, buff-striped keelback, Red sand boa, Cobra, Saw-scaled viper, Russell's viper, Common krait, Green whip snake etc. Furthermore, Indian Star tortoise and mugger crocodiles are also seen in their natural habitat here (www.ntca.gov.in). It is reported that tigers from Ranthambhore TR frequently move into RVTR via Kamleshwar-Mahadev closed area corridor (www.ntca.gov.in). Although tiger population within RVTR went locally extinct, few tigers from RTR have been observed to move into the area in the past decade, such as T-62 (in 2013), T-91 (in 2018), T-115 (presently) and T-110 (in the periphery area, adjacent to RVTR) (www.ntca.gov.in).

iii. National Chambal Sanctuary Project (Rajasthan)

National Chambal Sanctuary Project (NCSP), also known as National Chambal Gharial Wildlife Sanctuary, is India's only tri-state riverine PA shared between the states of Rajasthan, Madhya Pradesh and Uttar Pradesh (each having notified the Sanctuary limits within their respective geographical areas). In Rajasthan, the NCSP extends along the Chambal River from Jawahar Sagar dam to Kota barrage, and again after a free zone gap of 18 km, from Keshoraipatan (Rajasthan) to Samona (at the tri-state junction). NCSP is located between 25°35' and 26°52' north latitudes and 76°28' and 79°01' east longitudes (Meshram, 2010). A total length of 600 km of the Chambal River is part of the tri-state Sanctuary (all three states combined), and the width of the River included inside the Sanctuary is one (01) km from midstream on either side of the bank in Rajasthan and Madhya Pradesh, whereas Uttar Pradesh has a greater river width within Sanctuary limits (Hussain & Choudhury, 1997).

NCSP has ravine thorn forest cover (Champion & Seth, 1968) with sparse ground vegetation cover (Hussain, 1993). In addition, the Sanctuary harbours rich vertebrate fauna diversity, majorly of wetland-dependent avifauna (both migratory and resident), of more than 300 species (Nair & Krishna, 2013). This is because the Sanctuary is located on the migratory route of aquatic fauna providing an approximate stretch of 300 km of perennial wetland habitat for wintering birds. The presence of large congregations of birds feeding on fishes also indicates towards the rich diversity of fishes in the River (Meshram, 2010). Other important faunal species of conservation significance found include Gangetic dolphin *Platanista gangetica*, gharial *Gavialis gangeticus*, Indian Mugger crocodile *Crocodylus palustris*, Smooth coated otter *Lutrogale perspicillata*, various freshwater turtles and around 118 bird species including breeding populations of threatened river-island nesting birds such as Indian Skimmer *Rynchops albicollis*, Black-bellied Tern *Sterna acuticauda* among others. About 60 species of mammals are also found such as jackal *Canis aureus*, jungle cat *Felis chaus*, common langur *Semnopithecus entellus*, Indian crested porcupine *Hystrix indica*, Indian hare *Lepus nigricollis* and wild pig *Sus scrofa*.

Katdare (2020) reports that the ravines on either side of the Chambal River (part of the NCSP) host some of the lesser-known mammalian species such as the caracal *Caracal caracal*, Indian pangolin *Manis crassicaudata* and ratel *Mellivora capensis*, among many others. Katdare (2020) further adds that the ravines also contain den sites for many of the region's mammalian species such as the Indian fox *Vulpes bengalensis*, desert fox *Vulpes vulpes pusilla*, Indian wolf *Canis lupus pallipes*, striped hyaena *Hyaena hyaena*, as well as roosting and nesting sites of birds such as the Bonelli's Eagle *Aquila fasciata*, Egyptian Vulture *Neophron percnopterus*,

Brown Fish Owl *Ketupa zeylonensis*, Indian Eagle Owl *Bubo bengalensis*, Peregrine Falcon *Falco peregrinus* and Laggar Falcon *Falco jugger*. The ravines also serve to channel monsoon flood water away from villages nestled on higher ground, thereby being beneficial to both village inhabitants as well as providing diverse habitat for wildlife (Katdare *et al*., 2011). Massive cliffs and other steep structural formations along the River in the Kota district hold one of the largest vulture colonies in India along with suitable nesting sites for other raptors (Katdare, 2020). In addition, fish fauna includes a variety of carps, catfishes, mullet, cyprinids, mahseer and spiny eel (Nair, 2009; Banyal & Kumar, 2015).

Sr. no.	Protected Area	State	Year notified in	Area (in sq.km)	Min. distance from RTR (edge-to-edge, in km)
1	Ranthambhore NP	Rajasthan	1980	282.03	0 (part of RTR)
2	Kaila Devi WLS	Rajasthan	1983	676.38	0 (part of RTR)
3	Sawai Mansingh WLS	Rajasthan	1984	103.25	0 (part of RTR)
4	Sawai Madhopur WLS	Rajasthan	1955	131.30	0 (part of RTR)
5	Ranthambhore TR	Rajasthan	2007	1411.32	0
6	National Chambal Sanctuary Project	Rajasthan	1979	274.75	0
7	Ramgarh-Vishdhari WLS	Rajasthan	1982	252.79	0.12
8	Ramgarh-Vishdhari TR	Rajasthan	2022	1501.89	0.12
9	Bandh Baretha WLS	Rajasthan	1985	199.50	62.41
10	Ramsagar WLS	Rajasthan	1955	34.40	~ 82
11	Van Vihar WLS	Rajasthan	1955	25.60	86.09
12	Kesarbagh WLS	Rajasthan	1955	14.76	97.15
13	Bharatpur/ Keoladeo Ghana NP	Rajasthan	1981	28.73	~ 105
14	Ummedganj Bird Conservation Reserve	Rajasthan	2012	2.72	~ 44
15	Mukundara Hills TR	Rajasthan	2103	759.99	44.62
16	Mukundara Hills NP	Rajasthan	2006	200.54	51.41
17	Bisalpur Conservation Reserve	Rajasthan	2008	48.31	~ 47
18	Bhainsrorgarh WLS	Rajasthan	1983	229.14	68.33
19	Shergarh WLS	Rajasthan	1983	98.71	99.9
20	*Dhaulpur TR (Proposed)*	*Rajasthan*	*Proposed*	*1196.76*	*0*
21	Kuno National Park	Madhya Pradesh	2018	748.76	28.66
22	Gandhi Sagar WLS	Madhya Pradesh	1981	368.62	85.62
23	National Chambal Sanctuary Project	Madhya Pradesh	1978	435.00	159.9

Table 7: Essential details of Protected Areas located in and around Ranthambhore Tiger Reserve

iv. Kaila Devi WLS

KDWLS is situated in Rajasthan's Karauli district. It lies between 26°2' to 26°21' north latitude and 76°37' to 77°13' east longitude. It is the northern extension of Ranthambhore National Park and covers a total geographical area of around 676 sq.km (Gurjar & Chhangani, 2018; Das, 2011; Rasal *et al*., 2021) out of which around 401.63 sq.km falls under RTR's limits

(Rasal *et al*., 2021). KDWLS has a semi-arid climate with an average annual rainfall of around 750-800 mm mainly falling during the south-west monsoon period (July to September). Temperature ranges between 2°C to 15°C in winters, but daytime temperatures can touch around 47°C in summers (Rasal *et al*., 2021). KDWLS mostly comprises of Northern tropical dry deciduous and Northern tropical thorn forest types (Champion & Seth, 1968) with 80% of its vegetation covered by the dominant Dhonk *Anogeissus pendula* trees (Rasal *et al*., 2021). Other trees found in the area are Salar *Boswellia serrata*, Gurjan *Lannea coromandelica*, Palash *Monosperma butea*, Ronj *Acacia leucophloea*, Ber *Ziziphus sp*. and *Euphorbia sp*. scrub (Das, 2011). Geographically, it is mainly characterised by both Aravalli Hills and Vindhyan Hills system forming deep gorges (khoh) and table-top plateus (dang) (Rasal *et al*., 2021). The main deep gorges in the Sanctuary are Nibhera, Kudka, Chiarmul, Ghanteshwar, Jail and Chidi (Das, 2011). In addition, water courses present in the Sanctuary include the River Chambal which separates the KDWLS from Madhya Pradesh state to its east, while River Banas flows close to or along the Sanctuary's southern boundary (Das, 2011) separating it from Ranthambhore NP.

According to Gurjar & Chhangani (2018), KDWLS has a rich faunal diversity including carnivores like striped hyaena *Hyaena hyaena*, jackal *Canis aureus*, jungle cat *Felis chaus*, common mongoose *Herpestes edwardsi*, small Indian mongoose *Herpestes auropunctatus*, ruddy mongoose *Herpestes smithii*, palm civet *Paradoxurus hermaphroditus*, small Indian civet *Viverricula indica* and honey badger *Mellivora capensis*. Tiger *Panthera tigris* have started moving into, establishing territories and even breeding in KDWLS from the adjoining RNP since 2015 onwards when T-72's presence was first reported in the Sanctuary (Khandal, *pers. comm.*). In addition, large herbivore species in the area consists of chital *Axis axis*, sambar *Rusa unicolor* and nilgai *Boselaphus tragocamelus*. Common langur *Semnopithecus entellus*, wild pig *Sus scrofa*, rhesus macaque *Macaca mulatta*, porcupine *Hystrix indica*, Indian hare *Lepus nigricollis* and Indian Peafowl *Pavo cristatus* are other notable fauna within KDWLS.

2.5.2 Eco-Sensitive Zones (ESZs)

The delineation of ESZ for all Protected Areas lying wholly or partly within the CISA was done as described in section 1.4 of this Report, and following relevant ESZ guidelines issued by the MoEF&CC and the Hon'ble Supreme Court of India's Orders and Judgements on the matter (Figure 9 & Table 8). Some of the important guidelines issued therein are mentioned below.

i. First set of guidelines issued by the Wildlife Division towards delineation of ESZ around PAs (WLS & NP) under the Environment (Protection) Act, 1986, issued through Letter *F.No.1-9/2007 WL-I(pt)* dated 9th February 2011.

ii. Guidelines further clarifying the process of ESZ delineation around PAs (WLS & NP) by the Wildlife Division, issued through Letter *F.No.1-27/2014-WL* dated 25th September 2014.

iii. Guidelines towards the delineation of ESZs around Tiger Reserves, issued by the National Tiger Conservation Authority through letter *F.No.15-22/2013-NTCA* dated 23rd April 2018.

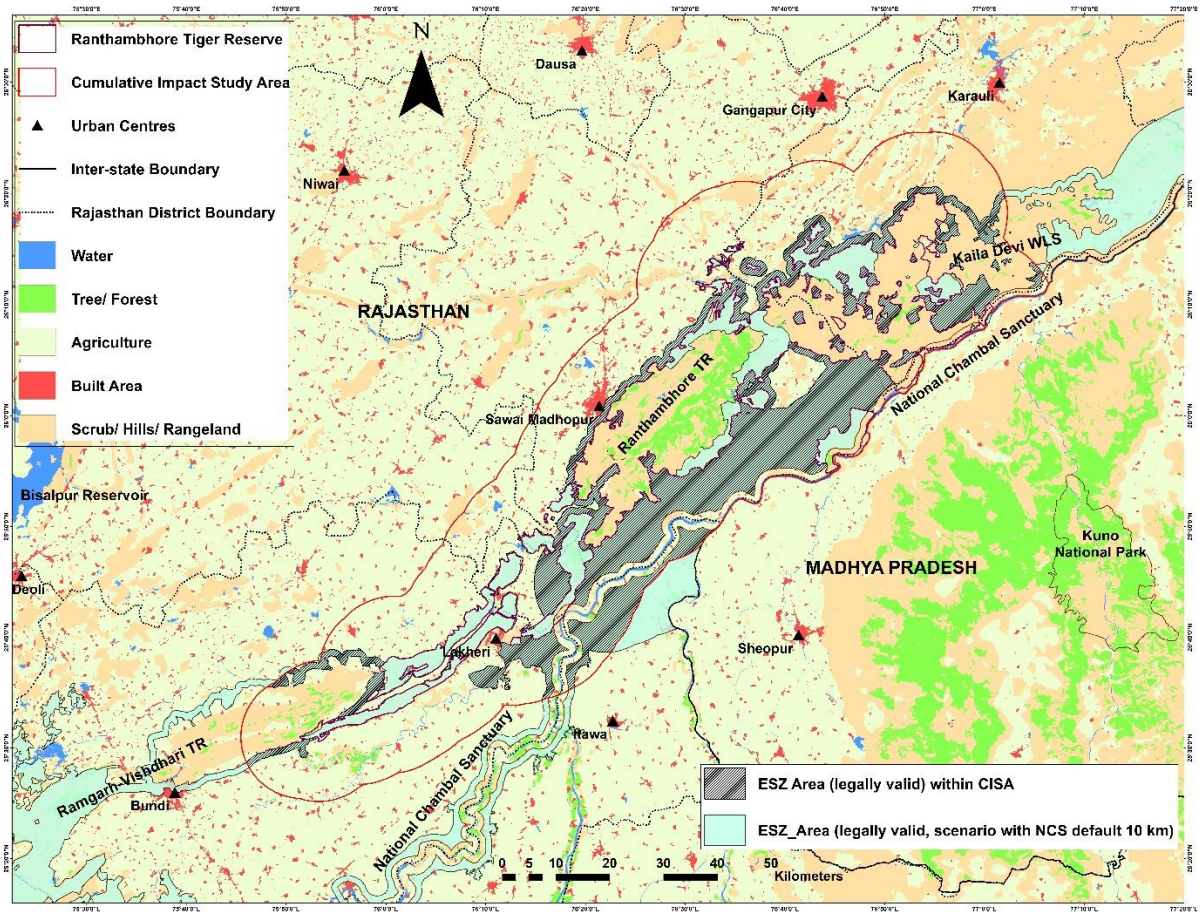

Figure 9: Map depicting the total legally valid ESZ (grey crossbar shaded area) within the CISA combining the individual ESZs of RTR, RVTR and NCSP, Rajasthan

Sr. no.	Area description	Area (in sq.km) (from provided or generated GIS files)
1	Ranthambhore TR – Proposed/ Legally valid ESZ (without NP/WLS)	1028.63
2	**Ranthambhore TR – Legally valid ESZ (*within CISA*)**	**467.834**
3	Ramgarh-Vishdhari TR – Proposed ESZ (without NP/WLS)	1143.699
4	Ramgarh-Vishdhari TR – Legally valid ESZ (without NP/WLS)	1154.5
5	**Ramgarh-Vishdhari TR – Legally valid ESZ *(within CISA)***	**157.295**
6	National Chambal Sanctuary Project, Rajasthan – Proposed ESZ (around RVTR's NCSP core only)	258.373
7	National Chambal Sanctuary Project, Rajasthan – Default 10 km-width ESZ (around non-RVTR core part of NCSP)	2344.93
8	National Chambal Sanctuary Project, Rajasthan – Legally valid ESZ (combining entries 7 & 8)	2545.46
9	**National Chambal Sanctuary Project, Rajasthan – Legally valid ESZ *(within CISA)***	**746.39**
10	**TOTAL ESZ – Legally valid *(within CISA)* (combining entries 3, 6 & 11 of legally valid ESZs of RTR, RVTR and NCSP, respectively)**	***1137.269***

Table 8: Various ESZ extents as per guidelines currently in force read with the latest Hon'ble Supreme Court of India's Order on the matter delivered in June 2022; commercial mining of all kinds and other allied polluting industries/ activities are prohibited within any ESZ

3. ENVIRONMENTAL & OTHER IMPACTS OF MINING ACTIVITIES

There are 31 total minor minerals declared by the Ministry of Mines, Government of India, including silica sand, sandstone (used as masonry stone) and sand. State governments have been given powers to make rules for these minor minerals to grant mining leases, under Section 15(2) of Mines & Minerals (D&R) Amendment Act of 2015 (Indian Bureau of Mines, 2020a).

In India, silica sand resources are widely distributed across many states including Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh (Mishra, 2015). According to the National Mineral Inventory, the total reserves/ resources of quartz and silica sand in India is estimated to be 3,907.95 million tonnes, out of which 647.53 million tonnes (17%) are placed under Reserves Category and 3,260.42 million tonnes (83%) are placed under Remaining Resources category (Indian Bureau of Mines, 2020a).

State	**Year 2017-18 (tonnes)**	**Year 2018-19 (tonnes)**	**Year 2019-20 (tonnes)**
Gujarat	8,53,48,103	8,61,82,776	NA
Andhra Pradesh	32,29,228	33,81,270	28,71,070
Rajasthan	8,43,845	19,20,000	13,29,000
Maharashtra	3,84,940	NA	8,79,007
Himachal Pradesh	500	3,000	1,500
Kerala	NA	NA	NA
Odisha	NA	NA	NA
Karnataka	NA	30,296	35,810

Table 9: State-wise production of Silica sand (Indian Bureau of Mines, 2020a)

On the contrary, the total estimation of sandstone in India has not been given much importance due to its easy availability and abundance. However, the Centre for Development of Stones (CDOS), which is a Government of Rajasthan Undertaking, has estimated the sandstone reserves at over 1,000 million tonnes in the country (Indian Bureau of Mines, 2020b). The state of Rajasthan has also reported the production of sandstone in the state as about 158.14 lakhs tonnes and 274.50 lakhs tonnes during 2018-19 and 2019-20, respectively. In India, sandstone resources are spread across the states of Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Madhya Pradesh, Meghalaya, Mizoram, Karnataka, Odisha, Punjab, Rajasthan, Uttar Pradesh, Tamil Nadu and West Bengal (Indian Bureau of Mines, 2020b).

Furthermore, the production data of sand mineral is also not provided by every state at each reach level, even though such data may be necessary for better planning and demand supply analysis for each state. According to the Draft Sand Mining Recommendations (Department of Mines, 2018), the production from river sand in Rajasthan is given as 62.8 MT in 2014-15, 48.4 MT in 2015-16 and 56.8 MT in 2016-17. Riverbed mining of sand has been witnessing increasing demand with an increase in human population and urban development. This has, in turn, led to the over exploitation of rivers and riverine ecosystems (Sonak *et al*., 2006). In addition, open cast mining practices of silica sand and masonry stone with such large scale production have led to environmental degradation. Many such environmental and social impacts of mining are discussed in the next section. The following paragraphs describe some of the most prominent mining activities being carried out in and around RTR within the CISA.

i. Silica Sand Mining

Silica sand/ industrial silica sand is composed of quartz mineral (or silicon dioxide, SiO_2) which is one of the most common mineral found on Earth's surface (10% of Earth's crust by mass). Industrial silica sand has the same composition as in sandboxes, riverbeds and beaches throughout the world (Orr & Krumenacher, 2015a). Physical characteristics that affect the suitability of sand deposits for industrial purpose are:

i. Size (determining what uses it is best suited for)
ii. Shape (Angular or spherical)
iii. Uniformity (whether the grain size are all relatively similar or different)
iv. Purity of the deposits (how much silica is present in the material as compared to other non-economic minerals).
v. Durability (sand's ability to resist crushing at high pressures and withstand high temperature) (Orr & Krumenacher, 2015a).

Raw silica sand deposits are excavated using open pits – a mining technique used when the desired mineral is present relatively near to the Earth's surface – thereby making the process of removing overburden (such as non-economical soil and rocks) easier; or by dredging mining methods in which the mineral is extracted from the bottom or banks of water bodies such as lakes, streams and rivers by removing the sediments. Post mining, the first step towards processing is the removal of vegetation and other overburden, which is a necessary and routine step in any construction or building activity (Orr & Krumenacher, 2015a). Glass sand is generally screened and washed to remove all the deleterious constituents for its use in the glass industry (Indian Bureau of Mines, 2020a). Using a processing plant, the gangue materials such as clay, feldspar, muscovite, heavy minerals and carbonates present in the topsoil and raw silica deposits are removed with the aim to achieve 95% or higher silica content in the concentrate with the correct size, shape, uniformity and purity based on its intended purpose, whether it is for glass or chemical industry, sandblasting, foundry, construction and civil engineering, filtration, agriculture, etc. (Grbeš, 2015).

ii. Masonry Stone Mining

Masonry stones are natural stones or rocks properly sized and shaped to use in combination with mortar, in order to build economical structures such as buildings, beams, foundations, walls, pillars, railway etc. These stones must be hard, tough and durable. Type of stones used in masonry construction is limestone, sandstone, granite, marble, laterite etc. Mortar is the building material which is a uniform mix used to bind the stones together for construction, such as cement or lime with sand and water **(**https://theconstructor.org/building/stone-masonry-construction-materials-and-classification/36306/). Mining of masonry stone involves drilling, blasting and use of rock breakers and crushers.

iii. Sand Mining

Sand is mainly extracted from riverbeds across the country. The presence of rivers in the buffer zone of RTR such as Chambal and Banas makes it an unfortunate hotspot for illegal mining of sand, boulder and gravel with grave implications for wildlife connectivity. There are different types of sediment extraction methods with varying magnitudes of impact. They are as follows:

a. In-stream mining: It is the most destructive method (Padmalal & Maya, 2014), where the riverbed material is mechanically removed from the active channel of the river.
b. Pit-mining: In this method, a pit is formed in the active channel of the river below the groundwater table to extract sand and gravel (Rentier & Cammeraat, 2022).
c. Bar- skimming: Bars are formed from sediment deposition due to the flow of water. In the bar skimming practice of mining, only the top portion of bar sediment is removed (Langer, 2003).

The following section now briefly describes the various kinds of impacts of silica sand, masonry stone and sand mining on the environment and biodiversity.

3.1 Environmental Impacts of Mining

3.1.1 Impact on air quality

Crystalline silica particles are very small particles of less than 10 micrometer diameter, which can be inhaled easily. Prolonged and continuous exposure to such particles called Respirable Crystalline Silica (RCS) can cause silicosis, which is a fatal lung disease common between miners and workers at mining sites (Thomas & Kelly, 2010). This suspended particulate matter (SPM) not only affects the air quality for the nearby human and animal communities, but also affects plants' ability to photosynthesise (Mishra, 2015). Photosynthetic activities of plants are reported to be strongly dependent on the leaf pH (Liu & Ding, 2008) and photosynthesis was reduced in the plants with low leaf pH (Türk & Wirth, 1975). According to Lakshmi *et al.* (2009), all plants that are intermediately tolerant have pH range of 4.4 to 8.8, which make these plants highly sensitive to air pollutants/ SPM. Rahul & Jain (2014) found that small plants with short petioles and rough leaf surface accumulated more pollutants than larger plants with longer petioles and smoother leaf surfaces. This statement holds true for most plants found in the semi-arid and tropical thorn forests of Rajasthan, where plants are generally smaller such as grasses and shrubs. A study done in the Dhanbad district of Jharkhand state reported that the major SPM in the area was mainly contributed by mining activities (Rahul & Jain, 2014).

3.1.2 Impact on water quantity

In the silica sand mining industry, water is used for various processes such as washing, suppressing fugitive dust, transport sand as slurry etc. (Orr & Krumenacher, 2015a). The volume of water used by this industry is large but if it is functional in a closed loop system, 90% of the water can be recycled where they can consume as little as 18,000 gallons per day, whereas open-loop systems can consume as much as two million gallons per day. The 10 percent of water lost in the closed loop systems occurs due to evaporation from ponds, drying moist sand, and placement of wet sand and fines (silt and clay particles) during mine reclamation. There are sometimes illegal practices of silica sand washing at mining sites which need to be managed and monitored to avoid these industries from interfering with the water availability of the area or depleting local groundwater reservoirs (Orr & Krumenacher, 2015a).

3.1.3 Impact on land degradation:

a. Impact on rock slope stability

In open-pit mining, slope failure is a major concern causing landslides as well as soil erosion. Their stability analysis and forecast needs to be done accurately, in order to prevent loss of life and machinery at mining sites. Instability occurs due to the presence of a combination of factors such as geological discontinuity like cracks, fractures, faults, joints, fissures, unfavourably oriented bedding planes as well as due to weak rock, blast damage, vehicle vibrations, adverse weather and inadequate design (https://www.minex.org.nz/assets/Uploads/Slope-stability-in-opencast-mines.pdf). Mining activity, such as poor blasting, not only affect the existing slope stability but can also loosen (by reducing the cohesion and increasing the ingression of water) and fragment the rock behind the slope face. Since rock slope failures are triggered when the shear stress is greater than the shear strength of the rock mass, poor blasting leading to ground vibration and seismic waves add to the shear stress of the rock and if it overpowers the shear strength of the rock over time, slope failure is possible (Kolapo *et al.*, 2022). Generally, there are four types of slope failures as follows:

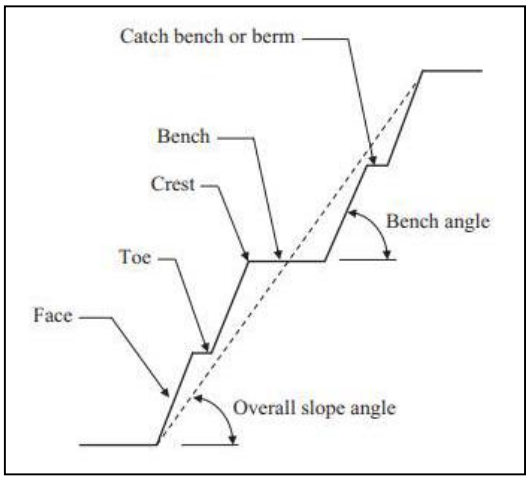

Figure 10: Schematic diagram showing open-pit bench slope parameters (reproduced from Chaulya & Prasad, 2016).

1) Planar failure (it occurs along a surface where a block moves downwards along a surface).
2) Wedge failure (it forms when two intersecting surfaces (such as bedding, faults, and joints) meet and the block moves downwards).
3) Toppling failure (it occurs as a result of vertical structures moving out and down due to lack of confinement).
4) Circular failure (it occurs when a mass of material moves in a downward direction leaving a circular shaped scour; most often occurs in weak material when ground conditions become saturated) (https://www.minex.org.nz/assets/Uploads/Slope-stability-in-opencast-mines.pdf).

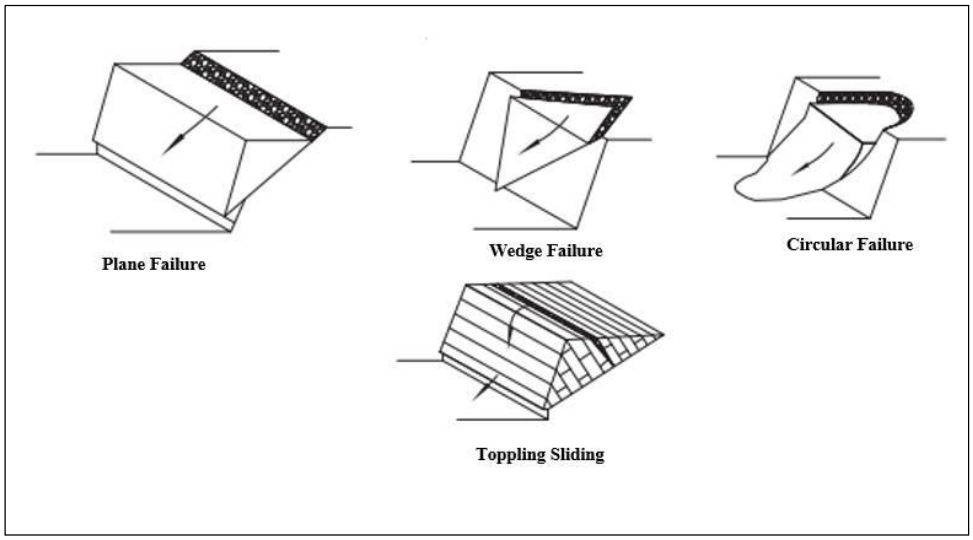

Figure 11: Classes of rock slope failure (reproduced from Babiker *et al*., 2014)

It was also found that concave slopes have better stability than straight slopes, and convex slopes have even lesser stability than straight slopes due to reduced lateral restraint (Wines, 2016). Since the condition of the groundwater also contributes to the stability of slopes, the excavations occurring in large areas can adversely impact the land structure and can further interfere with the natural course of water bodies (Mishra, 2015). While choosing the mining method as well as the types of equipment that adds to the stress of the slopes, it is important to consider these points for slope instability and deformation.

b. Impact on topography

In open cast mining, large areas are excavated to extract minerals, and even larger areas may be used to dump the mine spoils. This affects the vegetation cover, soil composition, surface area water (due to siltation) and drainage system of the area (Singh *et al*., 2010). The ratio of overburden excavated to the amount of mineral removed is called the stripping ratio. Lower stripping ratio indicates more productive mines (Sahu & Dash, 2011). According to the Indian Bureau of Mines, as reported in Sahu & Dash (2011), the average stripping ratio for limestone mines in India is 1:1.05 with large variation from mine to mine. For e.g., it is as high as 1.363 tonnes of overburden per tonne of limestone in the case of Madras Cement Limited. For iron ore mines, the stripping ratio ranges around 2-2.5. This means that for every tonne of iron ore produced, double the quantity of waste is generated. In 2003-04 itself, iron ore mines of Steel Authority of India Ltd. (SAIL) generated 4.76 million tonnes of overburden and rejects from its 12 mines in the country. Indian bauxite mines have a stripping ratio of around 1.2 as compared to only 0.13 in Australia. With the higher demand of coal in the country, its waste generation is even worse. If 1 million tonnes of coal were extracted, it would generate 15 million tonnes of waste material. The effect of these numbers is observed on the soil structure, biodiversity and green cover of the area, not just at the mining sites but perhaps even more on the off sites where waste material is accumulated (Sahu & Dash, 2011).

Sl. no.	Mineral	Production (MT)	Overburden/ waste (MT)	Estimated land affected (ha.)	Norms used (land in ha/ MT of coal/ ore)
1.	Coal	407	1493	10175	25
2.	Limestone	170.38	178.3	1704	10
3.	Bauxite	12.34	7.5	123	10
4.	Iron ore	154.4	143.9	1544	10
5.	Others	9.44	18.61	-	-

Table 10: Mineral production, waste generation and land affected in 2005-06 in India (Sahu & Dash, 2011)

c. Impact on microbial community, affecting the soil composition

In open cast mining, the removed topsoil is stored as a resource. According to Harris *et al*. (1993), these soils undergo changes in its microbial community in terms of their size and composition. During storage, there will be an increase in the numbers of bacteria, which make use of the nutrients available from the dead fungal biomass which did not survive through store construction. Fungi required for the necessary breakdown and incorporation of organic matter will thus be absent, which in turn affects the quality of the soil biomass, leading to poor nutrient recycling and poor soil structural stability (Harris *et al*., 1993).

3.2 Impacts on Wildlife and Wildlife Habitats

3.2.1 Impact due to noise pollution

Given that mining industries have large equipment and machinery, they produce significant noise under operation. Open cast mining where heavy transportation vehicles as well as blasting operations occur regularly, add on to the noise pollution in the area. This potentially impacts the wildlife of the area affecting their movements, habits and preferences as they tend to avoid areas with chronic noise (Wisconsin Dept. of Natural Resources, 2012). Duarte *et al*. (2015) found that mining noise affected the biophony of the region by altering the temporal dynamics and daily patterns of animal sounds, thereby significantly affecting the community-species composition, where animals near and far from mining sites depicted different behavioural patterns (Duarte *et al*., 2015).

In addition, the continuous anthropogenic disturbance in the form of miners and workers etc. could potentially make wild animals avoid these sites and choose different breeding grounds (leading to less reproductive success in the area overall) and other movement passages (Wisconsin Dept. of Natural Resources, 2012).

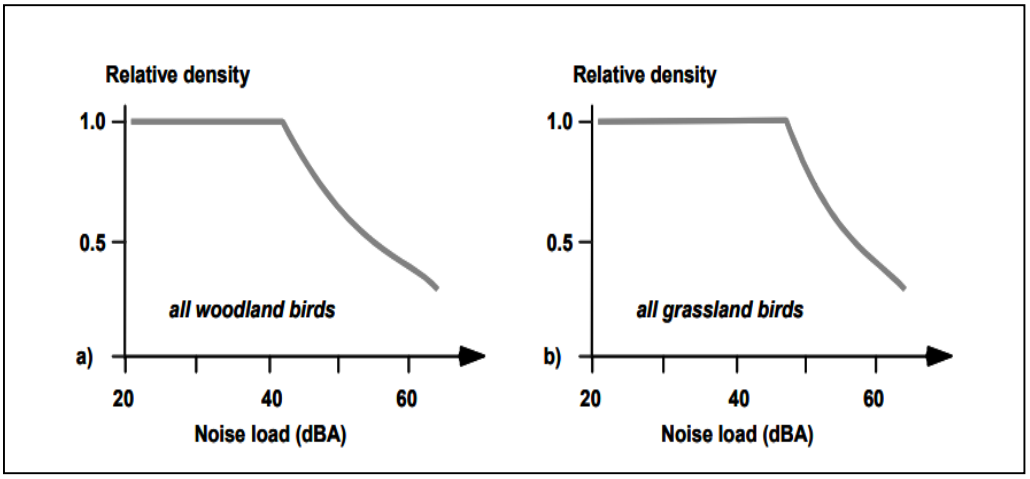

Figure 12: Empirical data from Reijnen *et al*. (1995) in Netherlands depict the impact of traffic noise on breeding bird populations – when the noise load exceeds a threshold of between 40–50 dBA, bird densities may drop significantly; sensitivity to noise and thus the threshold varies from species to species, and between forested and open habitats

3.2.2 Impact due to increased road traffic

Increased traffic from mining especially due to the heavy vehicle transports can lead to more human-wildlife conflict and increase in wildlife mortality due to incidental road kills (Wisconsin Dept. of Natural Resources, 2012). A study conducted from Mudumalai Tiger Reserve in Tamil Nadu found road mortality of 40 animal species including amphibians, reptiles, birds, and mammals (Baskaran & Boominathan, 2010). Reptiles and amphibians are amongst the most severely affected taxa, most likely due to their slow reaction to incoming vehicles (Das *et al.*, 2007). A recent study from the Kaziranga National Park landscape reported a total of 6,036 individual wildlife animal roadkills in a year, belonging to 53 species, 23 other taxa, comprising 30 vertebrate families. Herpetofauna was the most affected group, followed by birds and mammals (Sur *et al*., 2022).

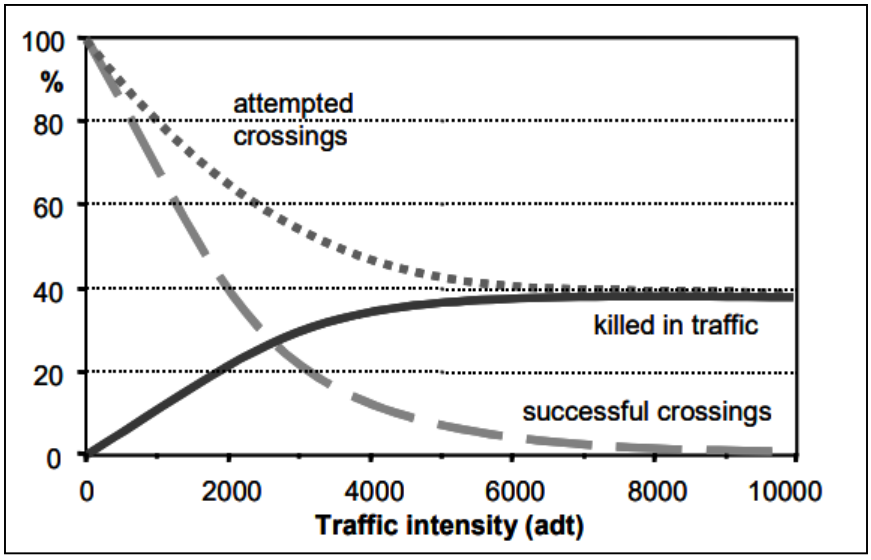

Figure 13: Theoretical model illustrating the relationship between traffic intensity *(adt = average daily traffic)* and the road's barrier effect – with increasing traffic, the number of road kill increases linearly until noise and vehicle movements repel more animals from attempting to cross the road; at very high traffic volumes, the total mortality rate could eventually decrease, but the resulting barrier effect – which is reciprocal to the rate of successful crossings – will add up to 100% (redrawn in Seilar, 2001 from Müller & Berthould, 1994)

Similarly, Behera & Borah (2010) also reported a large number of large mammal mortalities in road accidents in the Nagarjunasagar-Srisailam Tiger Reserve of Andhra Pradesh, including of protected species like leopard, sloth bear and rusty spotted cat, further highlighting the dangers arising from increased vehicular road traffic (without adequate measures in place) near wildlife-rich habitats.

3.2.3 Impacts of mining on forests

The practice of forestry and mining activities are mutually exclusive since clearing vegetation/ green cover from a given mining site is an essential first step towards setting up of any mining activity (Wisconsin Dept. of Natural Resources, 2012). Though forest reclamation is part of the mining operations and forests/ vegetation may be restored after mining ceases, such forests will not be identical to the original lost forests due to difference in their soil type, soil depth, and altered topography and groundwater levels (Wisconsin Dept. of Natural Resources, 2012). To improve and restore the fragile ecological system in an open-cast mining site, the co-evolution of both vegetation and soil should be considered since it was found that restoration of forest/vegetation depends exclusively upon factors such as soil organic matter, availability of K and N, rock content, soil bulk density, slope and soil particles determining the soil nutrients (Wang *et al*., 2016). These soil factors change drastically during mining activities making the original ecosystem of the forest significantly different from the ecosystem built after mining activity, for restoration.

3.2.4 Impacts of mining on wetlands

Effect of mining activities on wetlands can be of two types – direct and indirect – resulting in acute or chronic impacts. Direct impact is caused by the direct discharge of the excavation materials into the wetland to mine the sand deposits. This leads to change in the physical environment of the wetland leading to loss of its ecological value and ecosystem services that it provides to the local flora and fauna of the area. Indirect impact is mainly caused by alteration in the landscape, which changes the local hydrology and the groundwater levels of the affected area through surface drainage pattern changes (Wisconsin Dept. of Natural Resources, 2012). To minimise these impacts in the adjacent wetlands, dewatering of the excavation site can be avoided or dewatering/ wash water process can be developed with a closed system so that the pumped water stays on site and is not discharged to the adjacent surface waters (Wisconsin Dept. of Natural Resources, 2012).

3.2.5 Impact of mining on fisheries

Runoff from the mine sites settling into water resources such as rivers, streams and ponds can potentially harm the inhabiting aquatic life (Wisconsin Dept. of Natural Resources). Fine sediments either in suspended form or deposited in the water body can potentially have an impact on fishes, especially on their physiological functions (Kemp *et al*., 2011) such as elevated stress levels indicated by increased corticosteroid, glucose, and hematocrits and by reduced leukocrit levels in salmonids in certain empirical studies (Redding & Schreck, 1982; Redding *et al*., 1987; Lake & Hinch, 1999). This can gradually exert a negative impact on the fish community at population level (Birtwell *et al*., 1984).

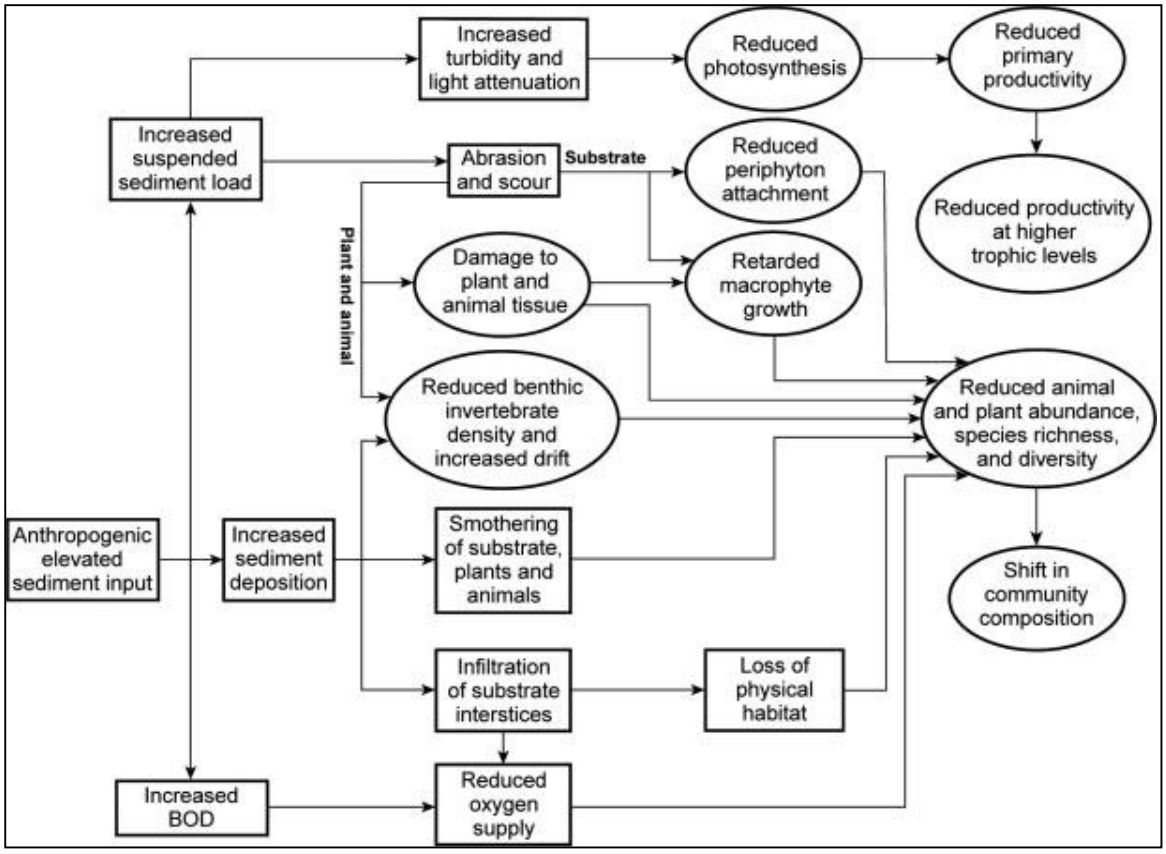

Figure 14: Negative impacts of anthropogenically enhanced sediment input to lotic aquatic systems on lower trophic levels. Rectangles and ovals respectively denote physiochemical effects and direct and long-term biological and ecological responses (reproduced from Kemp *et al.*, 2011)

Increased turbidity with an increase in sedimentation negatively affects visual feeders by reducing light percolation, consequently affecting these fishes' foraging behaviour (Kemp *et al*., 2011). Additionally, warm water runoffs can increase the water temperature which negatively affects cold water fishes and invertebrates of the system (Wisconsin Dept. of Natural Resources, 2012). Increased temperature can lead to decrease in fitness of the individual fish especially if it is close to a lethal limit. Sediments also compete with the oxygen demand of these fishes and even the size of the sediments affect the micropores of the egg chorion of fishes (Kemp *et al*., 2011).

3.3 Socio-Environmental Impacts of Mining

3.3.1 Impacts of mining on water quality

Surface water bodies such as streams, rivers, lakes, wetlands, ditches, ponds, reservoirs can be present near sand mining operations/industries. Considering that silica sand mining is a water intensive industry, the untreated water from the sites can infiltrate these clean water bodies as well as can potentially move downward and degrade the groundwater quality. Such negative effects are at maximum when the untreated water is directly discharged into the surface water bodies (Orr & Krumenacher, 2015a). There is also a concern regarding the chemical used for treating the water used for silica sand washing, called polyacrylamide. It is generally used by the municipal drinking water and wastewater treatment facilities and is considered as a safe chemical. Polyacrylamide allows the clay particles present in the water to clump together and settle out of the water faster than they would otherwise (Orr & Krumenacher, 2015a). However,

it also has trace amounts of acrylamide which is carcinogenic (Dearfield *et al*., 1988) and a neurotoxin (McCollister *et al*., 1964). But the effect of acrylamide is not shown hazardous considering the fact that it degrades quickly in the environment in the form of carbon dioxide, ammonia and nitrogen oxides. In oxygen-rich soils, 74 to 94 percent of the acrylamide breaks down within 14 days; in oxygen-poor soils, 64 to 89 percent breaks down in 14 days and in river water, 10 to 20 ppm levels of acrylamide degrade completely in 12 days. Given that the horizontal groundwater flow velocity is slow (a centimeter per day), acrylamide does not persist in groundwater. The trace amount of acrylamide that may be present in the groundwater is highly unlikely to contaminate the aquifer and neighboring drinking water wells but if mining sites are situated very close to the drinking wells, this chemical may contaminate those (Orr & Krumenacher, 2015a).

3.3.2 Weakening of road infrastructure

According to Orr & Krumenacher (2015b), heavy traffic especially caused by heavy vehicles and environmental factors such as rainfall and temperature are the two main reasons for weakening of road infrastructure. Some of the sand industries process their sand at the mining site; some others have conveyor belts or slurry systems to transport sand from mine sites to processing plant while many other industries transport their sand using the public roads exclusively. The materials used to build the public roads eventually wear-out creating potholes in addition to other structural failures.

Apart from the contribution of rainfall and temperature in this matter, the approximate weight of the vehicles on road play a major part on their weakening. These weights on road can vary from an average standard car load of 1.5 ton to an average loaded tractor trailer of 40 tons or an average loaded cement truck of 33 tons. Moreover, the distribution of the weight of the vehicles over the axles also contributes to the damage of road materials. By increasing the number of axles while maintaining even load distribution can reduce the impact of heavy vehicles on rural roads. Further improvements can be suggested after an engineering analysis on road design and by proper management of the roads that serve mining operations which can be monitored by the local government (Orr & Krumenacher, 2015b).

3.3.3 Impact on human health

Silicosis is a disease that is caused by the inhalation of the crystalline silica or SiO_2 which is a mineral mainly found in mines, stone, clay, blasting operations and glass manufacturing. These patients are at a high risk of developing other infections and disease such as tuberculosis. According to Ahmad (2015), 58% of the mine workers in rural Rajasthan diagnosed with silicosis were earlier treated for TB as well. Silica can be present at workplaces in its crystalline forms namely quartz, tridymite and cristobalite. Sandstone alone contains 67% of silica (mainly in quartz form). It is found that the prevalence of silicosis in stone quarry workers is 21% and among stone crusher workers is 12%. It is also found that the onset of silicosis occurs by the age of 25 years and maximum by the age of 40 which implies the gradual development of the condition (Ahmad, 2015).

3.3.4 Impact on lives and livelihood

According to Ahmad (2015), a majority of mining operations in India are being carried out illegally, and as a consequence without providing for statutory protective measures for people associated with these activities. Rajasthan alone produces 90% of sandstone in the country with Karauli and Dholpur being the main districts where sandstone deposits have 96% of SiO_2. Over 2.5 million workers in Rajasthan are employed in these unorganised mining and allied industry sectors, like slate pencil cutting, stone cutting and agate industry. These units and operations do not follow important protective provisions in laws such as The Factories Act, 1948 and/ or The Mines Act, 1952. Ahmad (2015) found that the average age to enter the mining profession was 22 years, while the minimum age was only 6 years. High morbidity of workers to occupational disease like silicosis eventually leaves their future generation in debt, who then also opt to work at the same mining sites to sustain their livelihood thereby initiating a cycle of misery and exploitation.

4. MINING POLICY FRAMEWORK

4.1 Union and State-specific Laws, Guidelines and Policies

I. Mines and Mineral (Development & Regulation) Act, 1957 (as amended until 2015)

MMDR Act, 1957, legislated by the Parliament of India, provides for the development and regulation of mines and minerals in the country. Some important sections of this Act and Rules framed thereunder pertaining to the sustainable use of natural resources and environment protection are given below.

- **Section 13 (qq):** the manner in which rehabilitation of flora and other vegetation, such as trees, shrubs and the like destroyed by reason of any prospecting or mining operations shall be made in the same area or in any other area selected by the Central Government (whether by way of reimbursement of the cost of rehabilitation or otherwise) by the person holding the prospecting licence or mining lease.

II. Mineral Conservation & Development Rules, 2017

- **Rule 35:** Sustainable mining – (1) Every holder of a mining lease shall take all possible precautions for undertaking sustainable mining while conducting prospecting, mining, beneficiation or metallurgical operations in the area.
- **Rule 36:** Removal and utilisation of top soil – (1) Every holder of a prospecting licence, prospecting license-cum-mining lease or a mining lease shall, wherever top soil exists and is to be excavated for prospecting or mining operations, remove it separately.
  (2) The top soil so removed shall be utilised for restoration or rehabilitation of the land which is no longer required for prospecting or mining operations or for stabilising or landscaping the external dumps.
  (3) Whenever the top soil is unable to be utilised concurrently, it shall be stored separately for future use.

- **Rule 37:** Storage of overburden, waste rock, etc. – (1) Every holder of a prospecting licence, prospecting license-cum-mining lease or a mining lease shall take steps so that the overburden, waste rock, rejects and fines generated during prospecting and mining operations or tailings, slimes and fines produced during sizing, sorting and beneficiation or metallurgical operations shall be stored in separate dumps.
  (2) The dumps shall be properly secured to prevent escape of material therefrom in harmful quantities which may cause degradation of environment and to prevent causation of floods.
  (3) The site for dumps, tailings or slimes shall be selected as far as possible on impervious ground to ensure minimum leaching effects due to precipitations.
  (4) Wherever possible, materials such as waste rock and overburden shall be back-filled into the mine excavations with a view to restoring the land to its original use as far as possible.
  (5) Wherever back-filling of waste rock in the area excavated during mining operations is not feasible, the waste dumps shall be suitably terraced and stabilized through vegetation or otherwise.
  (6) The fines, rejects or tailings from mine, beneficiation or metallurgical plants shall be deposited and disposed in a specially prepared tailings disposal area such that they are not allowed to flow away and cause land degradation or damage to agricultural field, pollution of surface water bodies and ground water or cause floods.
- **Rule 38:** Precaution against ground vibrations – Whenever any damage to public buildings or monuments is apprehended due to their proximity to the mining lease area, the holder of the mining lease shall carry out scientific investigations so as to keep the ground vibrations caused by blasting operations within safe limit.
- **Rule 39:** Control of surface subsidence – Stoping in underground mines shall be so carried out as to keep surface subsidence under control.
- **Rule 40:** Precaution against air pollution – Every holder of prospecting licence or a mining lease shall take all possible measure to keep air pollution due to fines, dust, smoke or gaseous emissions during prospecting, mining, beneficiation or metallurgical operations and related activities within permissible limits.
- **Rule 41:** Discharge of toxic liquid – (1) Every holder of prospecting licence, prospecting licence cum mining lease or a mining lease shall take all possible precautions to prevent or reduce the discharge of toxic and objectionable liquid effluents from mine, workshop, beneficiation or metallurgical plants, tailing ponds, into surface water bodies, ground water aquifer and useable lands, to a minimum.
  (2) The effluents referred to in sub-rule (1) shall be suitably treated, if required, to conform to the standards laid down in this regard.
- **Rule 42:** Precaution against noise – The holder of prospecting licence, prospecting license cum mining lease or a mining lease shall take all possible measure to control or abate noise arising out of prospecting, mining, beneficiation or metallurgical operations at the source so as to keep it within the permissible limits.
- **Rule 43:** Permissible limits and standards – The standards and permissible limits of all pollutants, toxins and noise referred to in rules 40, 41 and 42 shall be such as may be

notified by the concerned authorities under the provisions of the relevant laws for the time being in force.

- **Rule 44:** Restoration of flora – Every holder of prospecting licence, prospecting license cum mining lease or a mining lease shall carry out prospecting or mining operations, as the case may be, in accordance with applicable laws and in such a manner so as to cause least damage to the flora of the area held under prospecting licence, prospecting license-cum-mining lease or mining lease and the nearby areas.

III. Rajasthan Minor Mineral Concession Rules, 2017 (as amended up to 15th September 2020)

These are rules framed by the Rajasthan State government under the MMDR Act, 1957 of the Union government. Some important and relevant sections of the Rules are as follows.

- **Rule 29 (1):** No quarry license having area more than 1 hectare and mining lease shall be granted unless there is a mining plan duly approved by the competent authority.
- **Rule 29 (2):** No quarry license having area one hectare or less/ short term permit of an area up to one hectare shall be granted unless there is a simplified mining scheme duly approved by the competent authority.
- **Rule 29 (5): Submission and approval of mining plan/ simplified mining scheme:** The said mining plan/ simplified mining scheme shall incorporate:
  i. the plan of the precise area showing the nature and extent of the mineral deposit, spot or spots where the excavation is to be done in the first year and its extent, a detailed cross-section and detailed plan of spots of excavation based on the prospecting data gathered by the applicant and a tentative scheme of mining for the first five years of the lease/ license/ short term permit;
  ii. details of the geology and lithology of the precise area including mineral reserves of the area;
  iii. the extent of manual mining or mining by the use of machinery and mechanical devices on the precise area;
  iv. the plan of the precise area showing natural water courses, limits of reserved and other forest areas and density of trees, if any, assessment of impact of mining activity on forest, land surface and environment including air and water pollution, details of scheme for restoration of the area by afforestation, land reclamation, use of pollution control devices and of such other measures as may be directed by the Government from time to time;
  v. annual programme and plan for excavation on the precise area from year to year for five years;
  vi. progressive mine closure plan if the mining plan is for the area exceeding one hectare; and
  vii. any other matter which the Director or any officer so authorised may require the applicant to provide in the mining plan / simplified mining scheme.

- **Rule 34 (1):** Environmental safeguard – No mining lease or quarry licence shall be granted without obtaining prior consents, approvals, permits, no-objections and the like as may be required under applicable laws for commencement of mining operations.

- **Rule 34 (2):** Every mining lease or licence holder shall –
  i. carry out the mining operations in such a manner so as to ensure systematic development of the mine or quarry, conservation of mineral, protection of the environment and safety of the man and machinery;
  ii. ensure that no natural watercourse or water resources is obstructed due to any mining operation. Adequate measures shall be taken for protection of the older streams, if any, emanating or passing through the lease or licence area during the course of mining operation;
  iii. keep mine working restricted to above ground water level till approval of the Ground Water Department of the State is obtained;
  iv. temporarily store the top soil, at the place earmarked in the mine plan or scheme;
  v. dump over burden generated during the mining operations at earmarked dump site shown in the mine plan or scheme;
  vi. take effective safeguard, such as regular water sprinkling in critical areas prone to air pollution and having high levels of particulate matter such as around crushing and screening plant, loading and unloading point and all transfer points;
  vii. practice controlled blasting and implement mitigative measures for control of ground vibrations and to arrest fly rocks and boulders. Blasting shall be done only by a person holding blaster certificate from the Director General of Mines Safety. Deep hole blasting shall be carried out only after approval of the Director General of Mines Safety;
  viii. maintain the bench height and slope as per the Metalliferous Mines Regulations, 1961;
  ix. take all mitigative measures during the mining operations to ensure that the buildings or structures in the nearby areas shall not be affected due to blasting;
  x. use drills either equipped with dust extractors or operated with water injection system for wet drilling to control the pneumoconiosis and silicosis;
  xi. provide protective wears or respiratory devices to the personnel working in mining area and shall also provide adequate training and education on safety, environment and health aspects;
  xii. undertake to ensure minimum losses to the agriculture crops and undertake to contribute suitably for compensation to the loss or damage to the crops;
  xiii. organize regular health check-up camps for the workers engaged in mines and also periodically organize occupational health surveillance program for the workers to observe any contractions due to exposure to dust and take corrective measures, if needed;
  xiv. keep vehicular emissions under control and regularly monitor the same. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral;
  xv. provide insurance cover to all workers engaged in mines;
  xvi. take measures for control of noise levels within permissible limit;
  xvii. The non-saleable mineral rejects at mine bottom shall regularly be collected and transported to the surface and the mine floor shall be kept reasonably clear of debris;

xviii. Small lumps of mineral shall, as far as possible, be segregated from the dumps and stored separately for future use; and

xix. The ground selected for dumping of top soil, overburden, waste material or non-saleable mineral shall be away from workings of the mine.

IV. National Forest Policy, 1988

India's National Forest Policy of 1988 aims to preserve and maintain the natural heritage of the country, including its forests, deserts, rivers, lakes, reservoirs etc. and conserve the biodiversity dependent upon these ecosystems. It strives to ensures maximum forest productivity to meet national needs along with striving for the conservation of the natural environment. Some of the important and relevant sections within this policy are given below.

- **Section 4.1:** The national goal should be to have a minimum of one-third of the total land area of the country under forest or tree cover. In the hills and in mountainous regions, the aim should be to maintain two-third of the area under such cover in order to prevent erosion and land degradation and to ensure the stability of the fragile eco-system.
- **Section 4.3.1:** Schemes and projects which interfere with forests that clothe steep slopes, catchments of rivers, lakes, and reservoirs, geologically unstable terrain and such other ecologically sensitive areas should be severely restricted. Tropical rain/moist forests, particularly in areas like Arunachal Pradesh, Kerala, Andaman & Nicobar Islands, should be totally safeguarded.
- **Section 4.3.2:** No forest should be permitted to be worked without the Government having approved the management plan, which should be in a prescribed format and in keeping with the National Forest Policy. The Central Government should issue necessary guidelines to the State Governments in this regard and monitor compliance.

V. Rajasthan State Forest Policy, 2010

The objective of Rajasthan Forest Policy includes the conservation of floral and faunal diversity of the state, specifically that of rare and endangered species through *in-situ* and *ex-situ* conservation measures. Some important sections are given below.

- **Section 5.3.1:** Eleven districts of Rajasthan namely Alwar, Banswara, Baran, Bundi, Chittorgarh, Dholpur, Jhalawar, Karauli, Kota, Sirohi and Udaipur have more than twenty per cent forest area of their geographical area. Conservation and protection of these forests shall be primary focus and it needs to be strengthened by mobilization of man and material resources.
- **Section 5.3.4:** Mining in the forest areas shall be discouraged by all means. Mining operations cause innumerable damages to the forests. Thus, a judicious decision is required before permitting mining in these areas. The illegal mining in Rajasthan needs to be controlled by beefing up surveillance in forest areas through joint inspection of Mining, Forest and Police officials. The intelligence system can be developed to curb the illegal mining and informers of illegal mining activity in the forests would be

suitably rewarded without disclosing their identity. The mining associations of sand stone quarries must be motivated to take up compensatory plantation on degraded forest land set apart for them. Reclamation of the mined areas at the cost of miner should be enforced by mining department.

- **Section 5.7.6:** Reclamation of mined areas is primary responsibility of miners on the principle of polluter will pay. Due to deep mining, not only the dug up areas are devoid of top soil but the overburden is dumped over extensive area with rocky boulders and inert soils. These areas cannot be restored to green cover without providing nutrient rich soils for planting. Reclamation of mines should be an in-built condition for lease holders while granting of lease in future so that lessee may set apart some area in the beginning itself for stacking top soil in planned manner.
- **Section 5.9.5:** Further fragmentation of existing habitat will be discouraged.
- **Section 5.9.13:** Every National Park and Sanctuary will have an eco-sensitive zone delineated under the EPA, 1986 for minimising negative impact of polluting industries on natural habitats.
- **Section 5.9.17:** Degraded tiger habitats such as Ramgarh (Bundi), Bhainsrorgarh (Chittorgarh), Darah (Kota) and Jamua Ramgarh (Jaipur) will be improved by effective protection and habitat improvement including enhancement of depleted prey base.

VI. Rajasthan Mineral Policy, 2015

The Department of Mines and Geology (DMG) of Rajasthan, and the Department of Petroleum are the principal agencies for mineral exploration and mineral administration in the state of Rajasthan. The New Mineral Policy of 2015 views that the mineral resources are finite, thus emphasising on introducing cutting-edge technology in exploitation; minimising wastage, waste recycle and job-creation. One of the stated aims of the Policy is the study and development of methods for the disposal, control, and reclamation of mineral waste products, and the reclamation of mined land, so as to ***lessen any adverse impact of mineral extraction and processing upon the physical environment*** that may result from mining or mineral activities. Some of its other important and relevant sections are given below.

- **Section 5.1**: For sustainable mineral extraction, the policy aims for zero waste by adopting systematic and scientific mining with due safety, productivity, conservation, cost-effectiveness and adhering to the threshold parameters of environment, social commitments, health and welfare of people employed therein, utilising the mineral resources after value addition to augment the financial resources of the State.
- **Section 5.2:** The new mineral policy of 2015 aims to develop scientific mining techniques with due regard to safety, productivity, conservation, cost-effectiveness, environmental and social sustainability; and to curb illegal mining effectively.
- **Section 7.4:** To ensure sustainability in mining, there is a need to integrate environmental concerns into mineral development programmes and balance the conservation of flora and fauna and the natural environment with the need for social and economic development.
- **Section 7.4.1:** To ensure environmental sustainability during functioning of mine, **t**he government will undertake annual production programmes in the mining areas

earmarked by District Collector to restore green belt. The State government will ensure expeditious processing of cases involving forest land and Environment Clearance (EC). A senior officer of the Department will look after to expedite the process of getting EC. The state government will ensure adequate coordination between the State Directorate and the state pollution control board for the conduct of the Environmental Impact Assessment in a quick, transparent and professional manner and ensure facilitation of preparation, approval and monitoring of the Environmental Management Plan.

- **Section 7.4.2:** The state will ensure that the mines owner in their mining closure plans make adequate provision for reclamation and/or restoration of the land to the best possible potential use in collaboration with local communities. Reclamation/restoration efforts will specifically address issues of
  i. Bringing land into productive use;
  ii. Reducing soil erosion through vegetative means;
  iii. Dealing with chemical pollutants of soil and water;
  iv. Improving the water regime and recharge potential;
  v. Mitigating the adverse visual impact.
- **Section 7.5.2:** Small and isolated deposits of minerals are scattered all over the State. These often lend themselves to economic exploitation through small-scale mining. With modest demand of capital expenditure and short lead-time, they provide employment opportunities for the local population. However, due to diseconomies of scale they can also lead to sub-optimal mining and ecological disturbance. Efforts will be made to promote small-scale mining of small deposits while safeguarding vital environmental and ecological imperatives.

VII. National Mineral Policy, 2019

National Mineral Policy of 2019 emphasises on the use of scientific mining to prevent and mitigate the adverse environmental impacts due to mining activities.

- ***Under Section 6.10, it states that mining operations shall not ordinarily be taken up in identified ecologically fragile and biologically rich areas***. The Government shall identify such areas that are critically fragile in terms of ecology and declare as 'in-violate areas' or 'no-go areas' out of bounds for mining. In order to achieve a better semblance between mineral based development and environment, there shall be an endeavour to create Exclusive Mining Zone (EMZ) with prior in-principle statutory clearances demarcated for the mineralized belt/ zone to avoid conflict of interest and to curtail delay in commencement of mining operation.
- Under Section 6.13, it recognises that once the reserves in any mine are completely exhausted, there is need for scientific mine closure which will not only restore ecology and regenerate biodiversity, but also take into account the socio-economic aspects of such closure.

4.2. Provisions in Tiger Conservation Plans & ESZ Notifications

i. RTR TCP/PA Management Plan

The Tiger Conservation Plan (2022-23 to 2031-32) of Ranthambhore Tiger Reserve drafted by Yadav (undated) asserts that there are no mines within one km of the Tiger Reserve boundary, except for a minor mining activity (like Uliyana, Mei, Fariya, Arnetha etc.) against which strong legal actions have been taken. Due to the extension of the Tiger Reserve, legal mining leases had been cancelled in this area as well as in and around Kaila Devi and Sawai Mansingh sanctuaries. Since there was no legal source for building stone in places like Sawai Madhopur, while many locals were dependent upon the mining sector for their livelihood, illegal mining in these areas gradually increased. Thus, according to the TCP, there is a need to address these problems where certain forested and non-forested areas can be identified and diverted for legal mining leases. Furthermore, Yadav (undated) recommend the creation of alternate job opportunities for the affected people is recommended including qualification and training based job positions such as Nature Guides for the National Park. In addition, the TCP highlights the need for the demarcation of Kaila Devi WLS boundary (and of other sanctuary boundaries) by fixing their missing boundary pillars on ground to prevent occasional illegal mining and encroachment.

As far as the buffer zone of RTR is concerned, the TCP claims that no intensive form of land use is allowed such as felling of trees, mining and quarrying. The TCP mentions that NOC for such uses, if at all, are granted in private/ revenue areas only, after proper assessments. In case any such land uses are permitted or present in the buffer zone, the TCP proposes for the enforced adoption of appropriate mitigation measures without compromising the conservation objectives of the buffer. One such mining lease in the buffer zone is Lakheri Cement Works (a limestone mining area for cement plants) which has been in existence since 1917. Yadav (undated) prescribe to de-notify this area by taking it out of the buffer zone.

The (Draft) TCP of RVTR was not shared with the WII research team, nor was the NCSP, Rajasthan's Management Plan shared, hindering any analyses of prescriptions and observations therein concerning the overlapping issues of mining and wildlife/ forest conservation in and around the said reserves.

ii. Eco-sensitive Zone Notifications

Eco-sensitive Zones (ESZs) act as 'shock absorbers' around Protected Areas and serve as transition zones from high protection to lesser protection. These are meant to protect the fragile ecosystem of PAs. According to the February 2011 guidelines of MoEF&CC towards the delineation of ESZs, the width of an eco-sensitive zone can go up to 10 km and in case of ecologically important patches and sensitive corridors, this width can go beyond 10 km as well. In an ESZ, certain activities are regulated and/ or even encouraged, while others are completely prohibited, such as commercial mining. Except for meeting the domestic needs of bona fide local residents – including digging of earth for construction or repair of houses and for manufacture of country tiles or bricks for housing and for other activities – no mining activity is permitted within an ESZ. Mining operations can only be carried out in accordance with the Order of the Hon'ble Supreme Court dated 04.08.2006 in the matter of *T.N. Godavarman*

Thirumulpad Vs. UoI & others in W.P.(C) No.202 of 1995, and Order dated 21.04.2014 in the matter of *Goa Foundation Vs. UoI* in W.P.(C) No. 435 of 2012.

4.3 Judgements and Orders of Hon'ble Higher Courts of Judicature

The Indian judiciary has played a stellar role in exercising control over the executive and towards reminding the state of its Constitutional duties of protecting India's environment and natural heritage. Various interventions by the National Green Tribunal (NGT), High Courts and the Supreme Court of India have helped towards furthering the cause of environment and wildlife conservation. The NGT and other higher courts of judicature have issued repeated directives to conduct, regulate and monitor mining activities towards sustainable growth of the country, and following all laws, rules and policies in force in this regard. Some important judgements are briefly mentioned below.

i. Judgements based on the 'polluter pays' judicial principle

- Hon'ble NGT in its judgement dated 26.07.2022 in the case of *Sandeep Kumar Singh (Applicant) vs. State of Uttar Pradesh & Ors. (respondent)* (Original Application No. 299/2020) stated that illegal mining activities on the banks of rivers, in this case Kane, Yamuna, Bangey etc. in Banda District of Uttar Pradesh, adversely affected the environment. Thus, legality of such mining without prior replenishment study and statutory consent under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974, is untenable. The authorities may further recover the dues and compensation for illegal mining due to absence of mandatory replenishment study, following due process of law which may be used for restoration of the environment.
- In the matter of *Akshay Kumar Tripathy vs. State of Odisha & Others* (original application no. 84/2021) regarding illegal sand mining in the sand embankment of river Baitarani of Odisha, Hon'ble NGT in its judgement dated 05.08.2022 stated that sand mining from Ballipokhari Escape embankment on river Baitarani is causing distress among the locals since it has increased the chances of flood hazards, given that the sand deposited in the embankment was necessary to cause diversion of excess water from the river. The NGT directed the Chief Secretary of Odisha to initiate cases against illegal sand miners and also to pass appropriate orders under the Prevention of Money Laundering Act, 2002 against the offenders/ illegal miners. The Odisha State Pollution Control Board was also asked to further determine the Environmental Compensation and the District Authorities to determine the penalty/ royalty and proceed to take action against the illegal miners for recovery of the same in accordance with law.
- In the case of *Common Cause and Ors. Vs. Union of India and Ors* (writ petition civil no. 114 of 2014), the lessees in the districts of Keonjhar, Sundargarh and Mayurbhanj in Odisha mined large proportions of iron and manganese ore involving megabucks, causing huge distress among the tribal of the area and environmental degradation. Hon'ble Supreme Court in its 2017 judgement considered two key matters of mining irregularities that had serious consequences for environment, ecology and the state exchequer. These included issues of illegal mining in forest lands and iron ore produced without or in excess

of the EC stipulated amount. The court directed for 100% compensation from the mining companies under the provisions of the Mines and Minerals (Development and Regulation) Act, 1957 (as amended in 2015). The amount will be used for the benefit of tribals in the affected districts.

- Hon'ble High Court of Rajasthan, in its judgement dated 25.05.2012 in the matter of *Bhanwar Singh & Ors vs. Union Of India & Ors (*Civil Writ Petition No.6591/2011), declared that all mining activities within 10 km from the fort wall in question, of national importance will be cancelled and keeping in view, the effect of the reckless mining operations and blasting on ecology and environment (considering polluter's pay principle), private houses, crops of the area etc., these mine holders shall pay compensation for restoring back the ancient monument to the extent it is possible after damage.
- In the matter of *Jagriti Sansthan vs. State of Uttar Pradesh* concerning illegal extraction of ground water for washing silica sand without obtaining the mandatory NOC from Central Government Water Authority (CGWA) and without putting in place groundwater recharge mechanism in Shankargarh block in Allahabad district of UP (according to the policy for sustainable ground water management in UP 2013), the Hon'ble NGT in its judgement dated 16.07.2020 in order no. 186/2019, said that mere closure of mining units will not wipe out the company's liability for the violations already committed against the environment. Actions for recovery compensation was ordered to be taken from all the violators following due process of law.

ii. Judgements espousing the 'precautionary principle' in matters related to environment and ecology

- The Hon'ble Supreme Court of India in its judgement dated 28.08.1996 in the case of *Vellore Citizens Welfare Forum Vs. Union of India*, said that the precautionary principle is part of the environmental Law in India. It further stated that onus of proof is on the actor of the developer/industrialize to show that its actions are environmentally benign.
- The Hon'ble Supreme Court of India in its judgement dated 13.12.1996 in the matter of *M.C. Mehta Vs. Kamal Nath* said that under Article 21 of Indian Constitution incorporates the "Public Trust Doctrine". The Public Trust Doctrine primarily rests on the principle that certain resources like air, sea, waters and the forests have a great importance to the people. The said resources, being a gift of nature, should be made freely available to everyone irrespective of the status in life. The doctrine enjoins upon the Government to protect the resources for the enjoyment of the general public rather than to permit their use for private ownership or commercial purposes.
- Hon'ble High court of Rajasthan in its judgement dated 20/10/ 2004, in the case of *Ashwani Chobisa vs. Union of India and Ors* (D.B. Civil Writ Petition no. 7544/03) directed that the State shall ensure that the stone crushers comply with the norms laid down under the Environmental Protection Act (1986) and MMDR Act and effective steps for reclamation of abandoned mines shall be taken by having them filled up by over burden, waste and fly ash from the thermal power plants. Mines from which water is being discharged should be closed to prevent wastage of water and depleting of ground water and state shall designate the sites for dumping the over-burden. Also, the mine owners

shall secure a certificate from the Forest Department certifying the extent and nature of the plantation which is required to be undertaken.

iii. Judgements passed espousing the judicial principle of sustainable and socially just development

- In the matter of *Samaj Parivartana Samudaya and Ors. Vs. State of Karnataka and Ors* (writ petition civil no. 562 of 2009), a decade of large-scale illegal mining of iron ore in the state of Karnataka under poor governance was reported, including encroachments, mining without necessary permits and clearances, mining outside the permitted areas, mining beyond permitted quantities, illegal transportation of minerals etc. Hon'ble Supreme Court in its judgement dated 18.04.2013 banned these mining operations keeping in view the precautionary principle against overexploitation of natural resources in the districts of Bellary, Tumkur and Chitradurga which was imposed in 2011. This ban was lifted by the court in 2013 where it made further directions towards promotion of the sustainable development principle, *"in the past when mining leases were granted, requisite clearances for carrying out mining operations were not obtained which have resulted in land and environmental degradation. Despite such breaches, approvals had been granted for subsequent slots because in the past the authorities have not taken into account the macro effect of such wide-scale land and environmental degradation caused by the absence of remedial measures (including rehabilitation plan). Environment and ecology are national assets. They are subject to intergenerational equity. Time has now come to suspend all mining in the given areas on sustainable development principle which is part of Articles 21, 48–A and 51–A (g) of the Constitution of India."* The Court also suggested that the principle of these articles also keeps the option of imposing a ban in future open.
- In the matter of *Goa Paryavaran Savaraksham* (applicant) *vs. The Dy. Collector/Sdm* (Respondent) (Original Application No. 77/2018), Hon'ble NGT in its judgement dated 09.10.2020 directed that there shall be no quarrying of sand in any river bed or adjoining area or any other area which is located within 500 m (are within the parameters as fixed by CPCB) radial distances from the location of any bridge, water supply system, infiltration well or pumping installation. Sand quarrying shall not be carried out below the ground water table under any circumstances. In case, the ground water table occurs within the permitted depth of 1 meter, quarrying operation shall be stopped immediately. The sand mining should not disturb in any way the turbidity, velocity and flow pattern of the river water and the mined out pits are to be backfilled where warranted and area should be suitably landscaped to prevent environmental degradation.
- In the case of *Orissa Mining Corporation vs. Ministry of Environment & Forest (MoEF) and others* (writ petition civil no. 180 of 2011), MoEF rejected the stage II/ final forest clearance for diversion of 660.7 hectares of forest land in Niyamgiri hills, in Kalahandi and Rayagada districts of Orissa for bauxite mining. The decision was mainly based on the observation made by the Forest Advisory committee, pointing that two primitive tribal groups (Dongaria Kondh and Kutia Kondh) depend on the given forest for their livelihood. Their opinion and consent on the project clearance was not considered by the mining companies which violates the provisions of Forest Right Acts of 2006. In addition, such

mining activities leave a heavy impact on the ecology and biodiversity of forested lands by which the Hon'ble Supreme Court of India in its judgement dated 18.04.2013 quoted, "*land is their most important natural and valuable asset and imperishable endowment from which the tribal derive their sustenance, social status, economic and social equality, permanent place of abode, work and living. Consequently, tribes have great emotional attachments to their lands*". Thus, the court directed to protect their individual rights (for occupation and cultivation), community rights (for grazing, fuel wood collection, fishing, ownership, and disposal of non-timber forest produce) and the rights to protect, regenerate, conserve, and manage community forest resource (CFR) areas, under the provisions of FRA 2006. Thus, consent from gram-sabha is important to get statutory approval.

iv. Judgements passed protecting Eco-sensitive and buffer zones around Protected Areas

- Hon'ble Supreme Court of India in its judgement dated 21.04.2014, in the matter of *Goa Foundation Vs. Union of India* (writ petition civil No. 435 OF 2012) stated that until the order dated 04.08.2006 of the Court is modified (by the Court) in I.A. No.1000 (T.N. Godavarman Thirumulpad Vs. Union of India & Ors.), there can be no mining activities within one kilometer from the boundaries of National Parks and Sanctuaries in Goa. However, by the order dated 04.12.2006 in Writ Petition (C) No.460 of 2004 (Goa Foundation Vs. Union of India), mining activities within 10 kilometers distance from the boundaries of the National Parks or Wildlife Sanctuaries is not prohibited.
- In the matter of *T.N. Godavarman Vs. Union of India* (Civil writ petition no. 202/1995), supreme court in its order dated 04.08.2006 has stated that Temporary Working Permit (TWP) will be granted only if it is not located within any protected area notified under Section 18, 26-A or 35 of the Wildlife (Protection) Act of 1972 and that the TWP is not resulting in any mining activity within the safety zone of the PAs. Further, one kilometer of Eco-Sensitive Zone is to be maintained around the PAs subject to the orders that may be made in I.A. No.1000 regarding Jamua Ramgarh Sanctuary of Rajasthan.
- Hon'ble Supreme Court of India in its order dated 11.12.2018 in the case of *T.N. Godavarman Vs. Union of India* (Civil writ petition no. 202/1995) observed that there were a total 662 National Parks and Wildlife Sanctuaries in India. Proposals for declaring areas around these National Parks and Wildlife Sanctuaries as Eco Sensitive Zone have been received from state governments/ UT administrations for 641 National Parks and Wildlife Sanctuaries which have been accepted and Draft/ Final notifications have been issued. However, no such proposal have been received in respect of 21 National Parks and Wildlife Sanctuaries located in Assam, (erstwhile) Jammu & Kashmir, Karnataka, Maharashtra, Manipur, Meghalaya, Nagaland, Uttar Pradesh and West Bengal states. The court directed the MoEF&CC to draw an area of 10 km around these 21 National Parks and Wildlife Sanctuaries at the earliest to be declared as Eco Sensitive Zone, for the maximum protection of wild animals and birds in and around these PAs.
- Hon'ble NGT in its judgement dated 11.10.2017, in the case of *Babu Lal Jajoo Vs. Union of India & Ors.* (Original Application no. 431/2016), stated that no mining activity can take place in the area that falls under forest land and in the sanctuary or in its buffer zone. However, mining can be carried out on the revenue land, subject to compliance of all the laws in force.

5. WILDLIFE OCCURRENCE & DISTRIBUTION WITHIN CISA

5.1 Large mammal (RET) & Schedule-I species' occurrence and suitable habitat

From available data generated through WII's various research projects carried out in and around RTR, including the All India Tiger Estimation Exercise of 2018 (Jhala *et al*., 2021, 2022), it is clear that many of the rare, endangered and threatened (RET) mammalian fauna of conservation importance occur fairly widely in the landscape within the CISA. While leopard *Panthera pardus* and Indian wolf *Canis lupus pallipes* are most widely distributed, tiger *Panthera tigris* and Indian pangolin *Manis crassicaudata* seem more restricted in their habitat use and preference. All species of conservation concern, except tiger, seem to be using all existing corridors in the landscape, possibly for moving between source population areas. This is especially concerning since the Ranthambhore National Park is an important tiger source population in the wider Central Indian-Eastern Ghats landscape, and it is imperative that conservation efforts are invested in ensuring that tigers have safe passage to and well-protected requisite habitat in other neighbouring Protected Areas and forests in the larger landscape. Maps depicting the presence and distribution of selected RET large mammalian fauna in 1 sq.km grids overlaid with wildlife corridors and mining locations within the CISA are provided below through Figures 15-27.

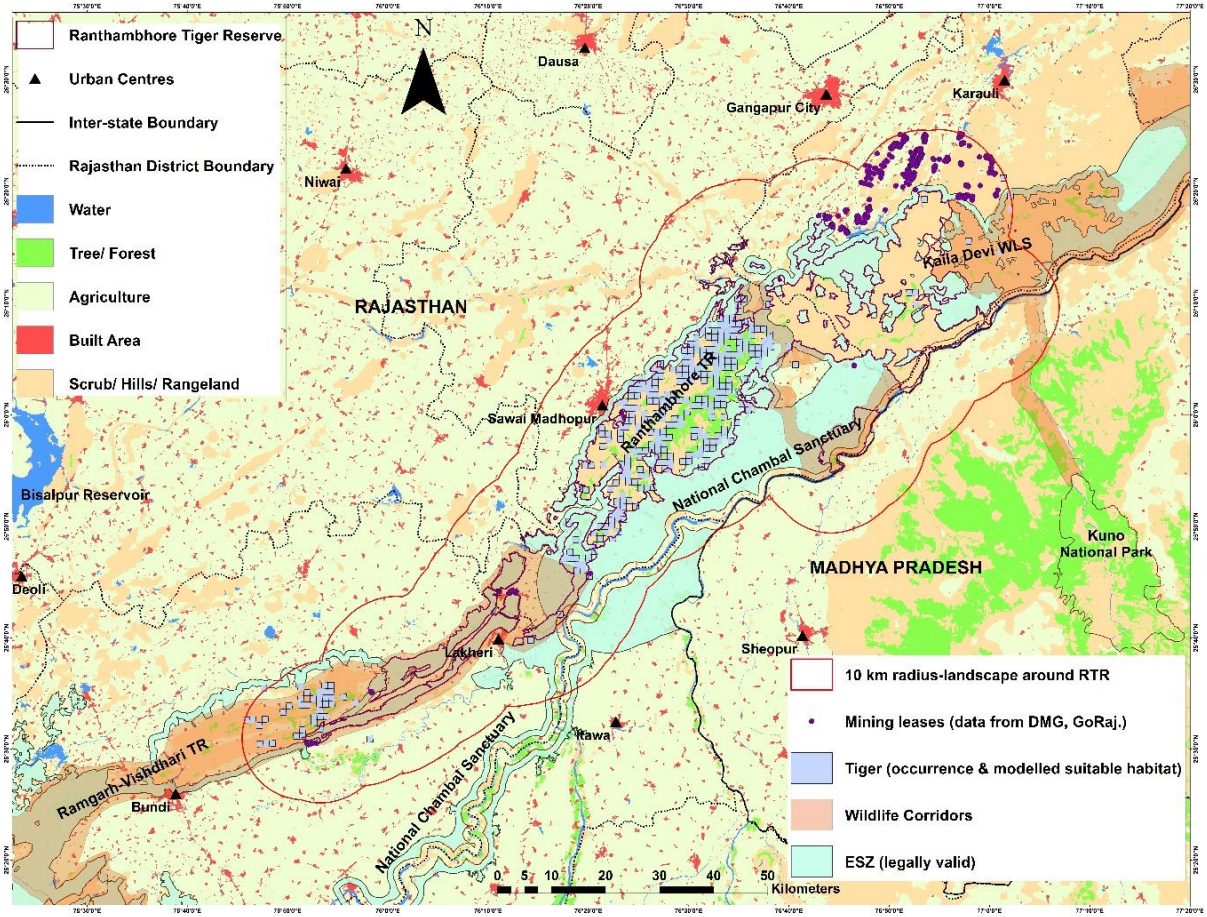

Figure 15: Tiger *Panthera tigris* occurrence and suitable habitat in and around RTR

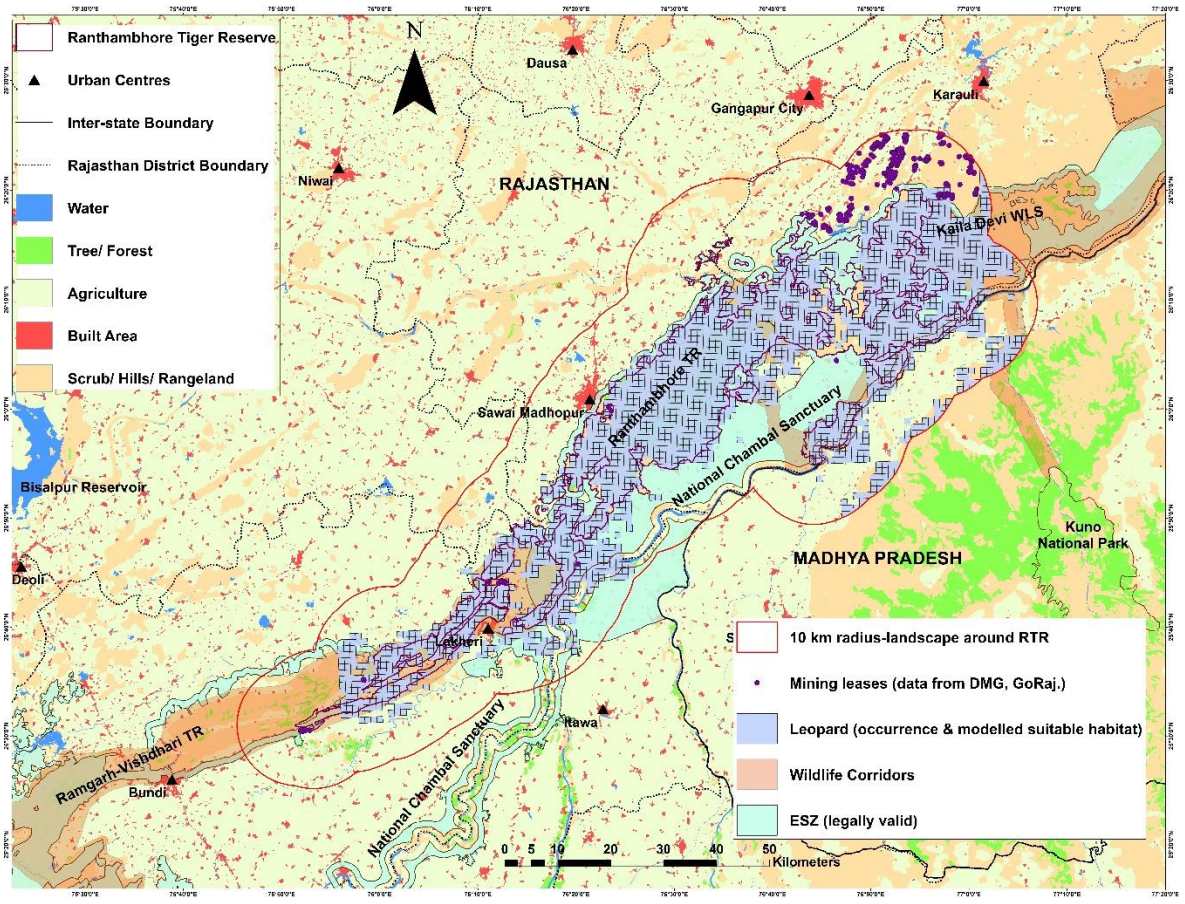

Figure 16: Leopard *Panthera pardus* occurrence and suitable habitat in and around RTR

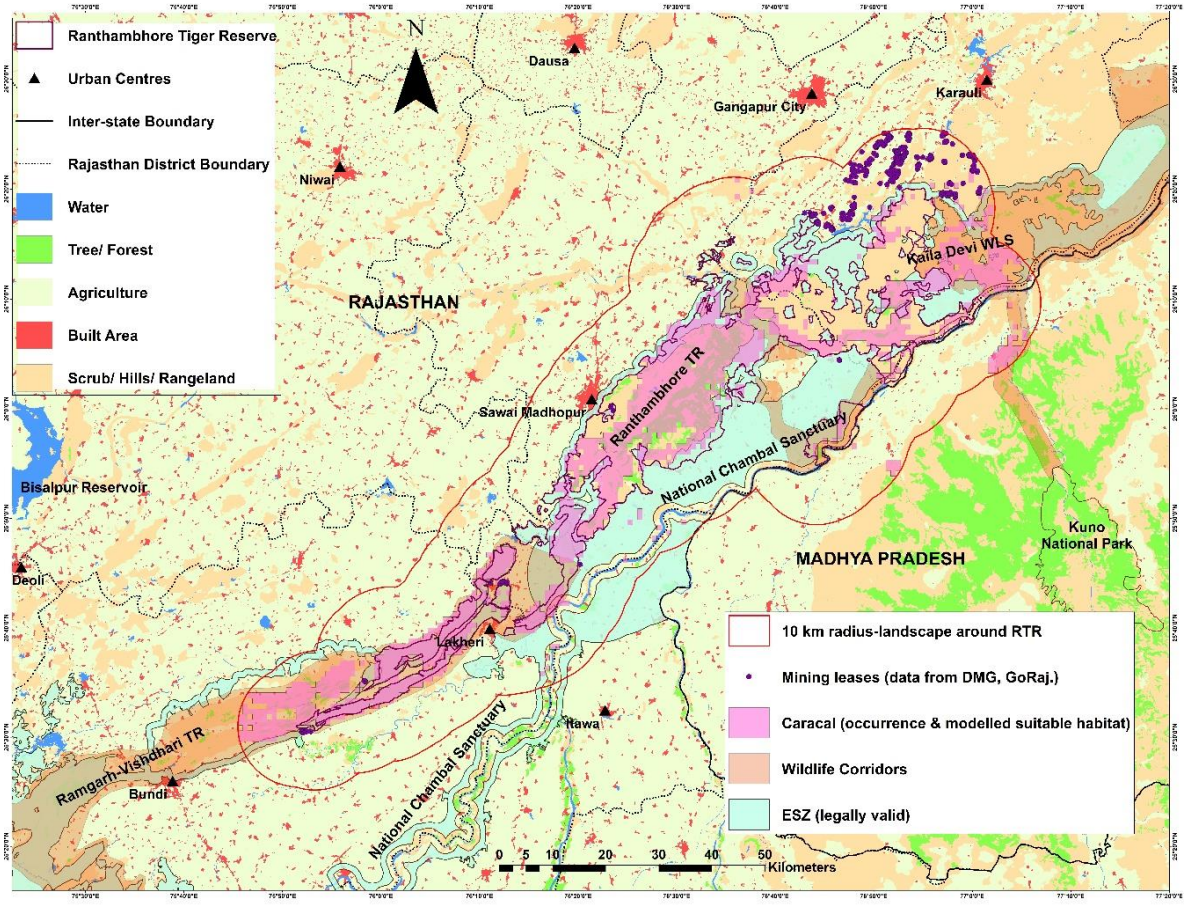

Figure 17: Caracal *Caracal caracal* occurrence and suitable habitat in and around RTR

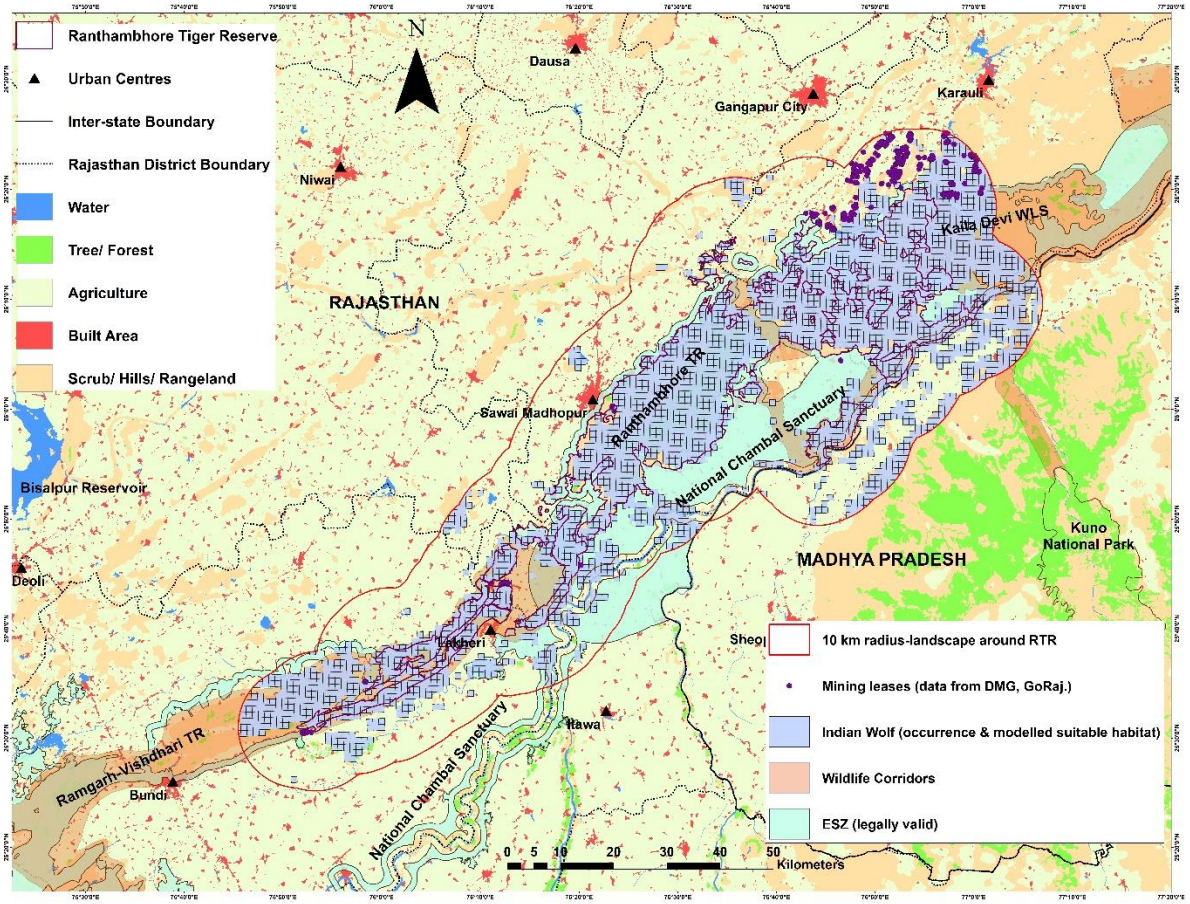

Figure 18: Indian wolf *Canis lupus pallipes* occurrence and suitable habitat in and around RTR

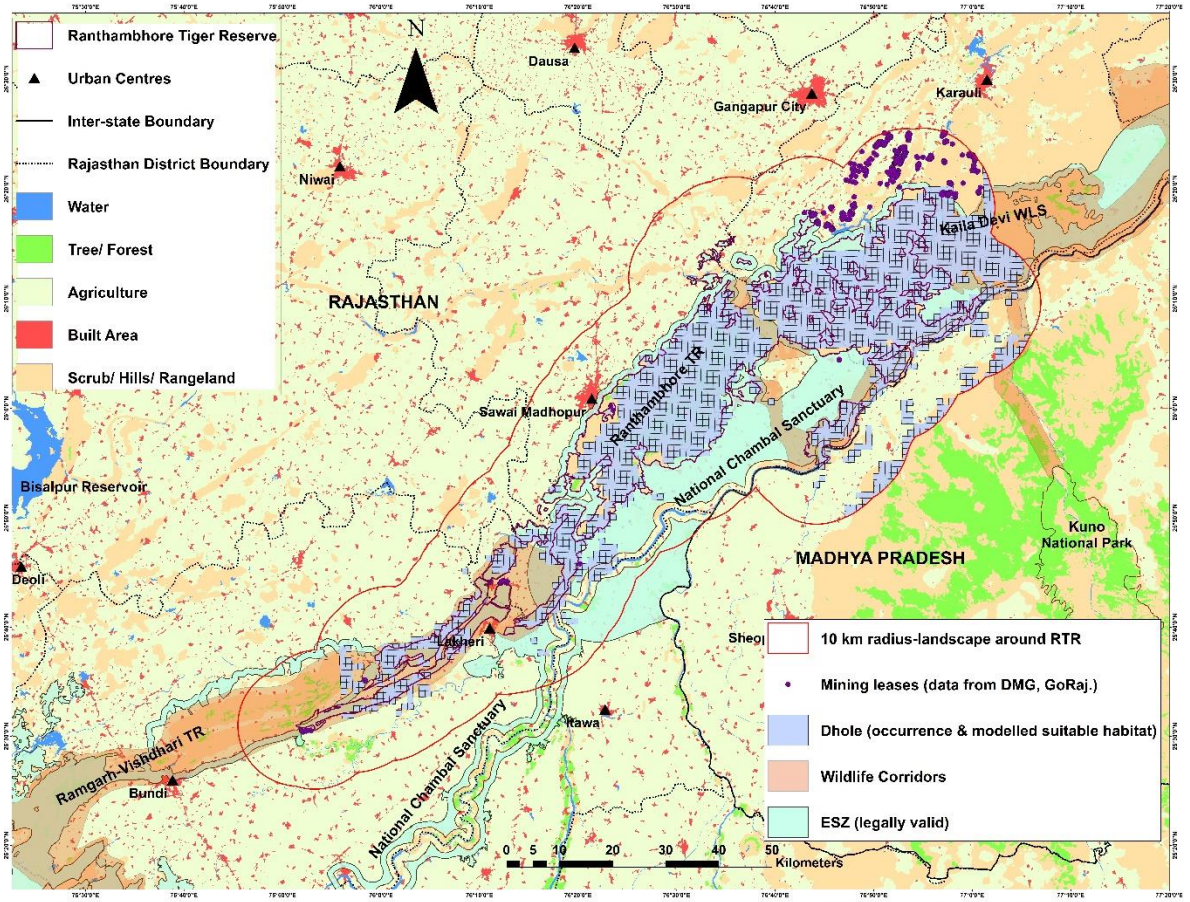

Figure 19: Dhole *Cuon alpinus* occurrence and suitable habitat in and around RTR

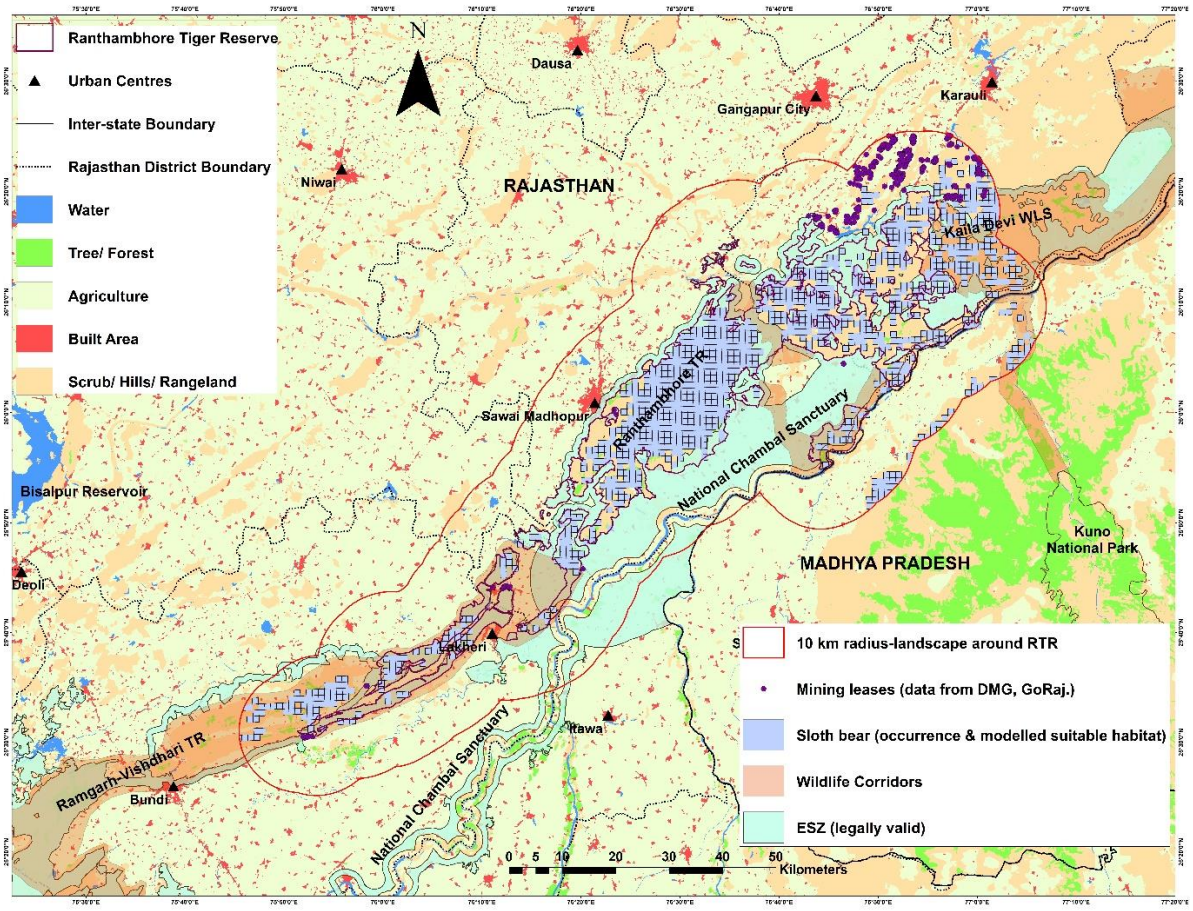

Figure 20: Sloth bear *Melursus ursinus* occurrence and suitable habitat in and around RTR

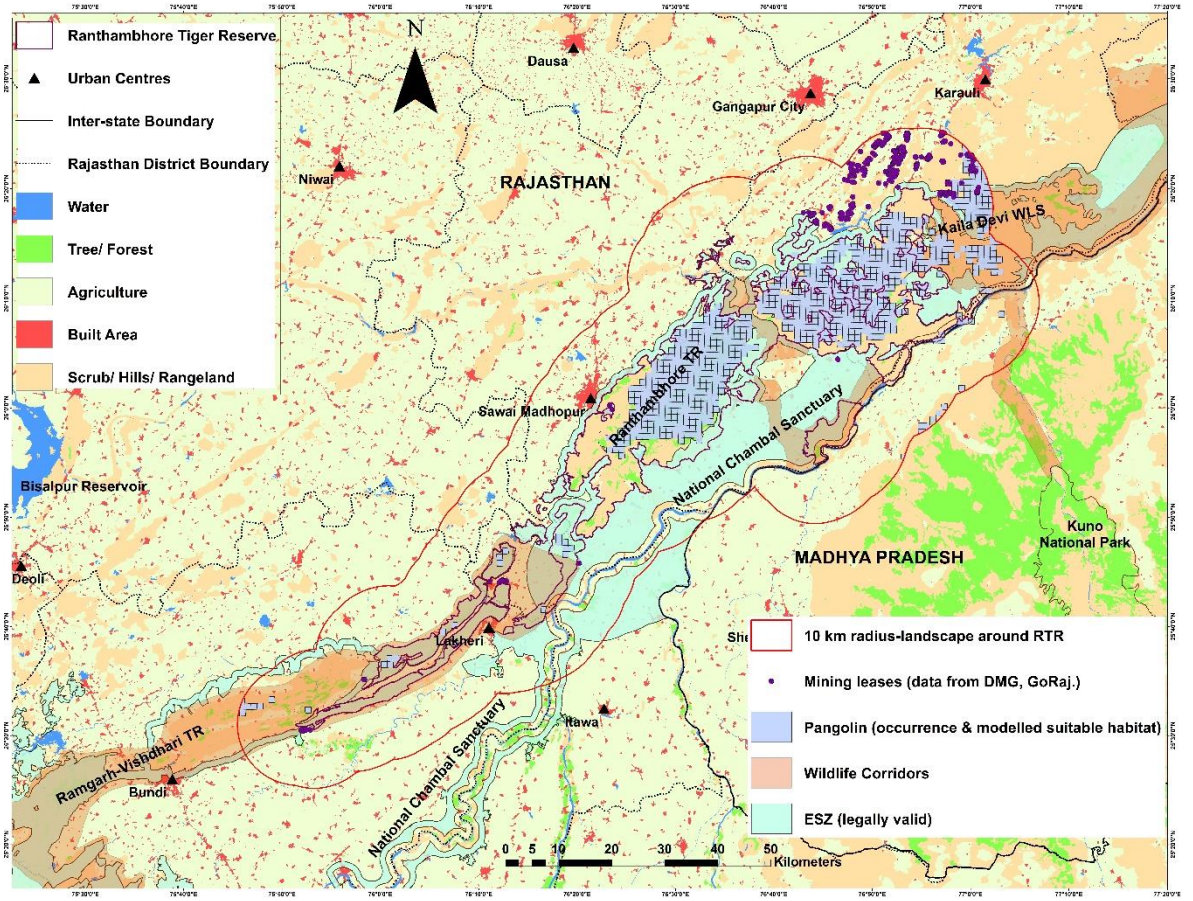

Figure 21: Indian pangolin *Manis crassicaudata* occurrence and suitable habitat in and around RTR

Sr. no.	Species (scientific name)	Species (common name)	IUCN status	WLPA, 1972 status	Occurrence & suitable habitat (sq.km) within CISA
1	*Panthera tigris*	Tiger	EN	Sch. I	63.49
2	*Panthera pardus*	Leopard	VU	Sch. I	762.05
3	*Caracal caracal*	Caracal	LC	Sch. I	377.396
4	*Canis lupus pallipes*	Indian wolf	LC	Sch. I	1062.83
5	*Cuon alpinus*	Dhole	EN	Sch. I	469.406
6	*Melursus ursinus*	Sloth bear	VU	Sch. I	260.18
7	*Manis crassicaudata*	Pangolin	EN	Sch. I	177.49
TOTAL (combined)					**1300.01**

Table 11: Select large RET mammalian species' occurrence and (modelled) suitable habitat within the Cumulative Impact Study Area (CISA) used to generate a combined '*threatened wildlife*' layer towards delineating critical zone for wildlife in this assessment; note that even though Indian wolf and Caracal are not globally threatened, they are two of the most important species in the Ranthambhore landscape, and generally require urgent conservation investments action in the country to arrest their declining populations, halt and restore currently shrinking habitats and prevent persecution/ hunting (Jhala *et al*., 2021; Jhala *et al.*, 2022)

5.2 Wildlife Corridors

Ranthambhore Tiger Reserve (RTR) is part of the western Indian landscape that has Sariska TR in the north, Kuno-Palpur WLS & Kuno NP and Madhav NP in the east (both in Madhya Pradesh), Ramgarh-Visdhari WLS & TR and Mukundara Hills NP & TR to its south-western part (Figure 1). While tiger population within RTR core are fairly stable and, in fact, at or near their carrying capacity (Sadhu *et al*., 2017; Jhala *et al*., 2021), suitable areas in the larger landscape remain largely unutilised due to anthropogenic pressures on existing wildlife corridors.

Some of the identified wildlife corridors in the larger Ranthambhore landscape lying either partly or wholly within the CISA are as follows (Figure 22, Table 12).

1. Kaila Devi – Sewati – Kuno
2. Kila Khandar – Sewati
3. Kaila Devi – Kuno
4. Ranthambhore – Ramgarh-Vishdhari – Mukundara
5. Ranthambhore – Banas – Kaila Devi
6. Kaila Devi – Dhaulpur – Van Vihar

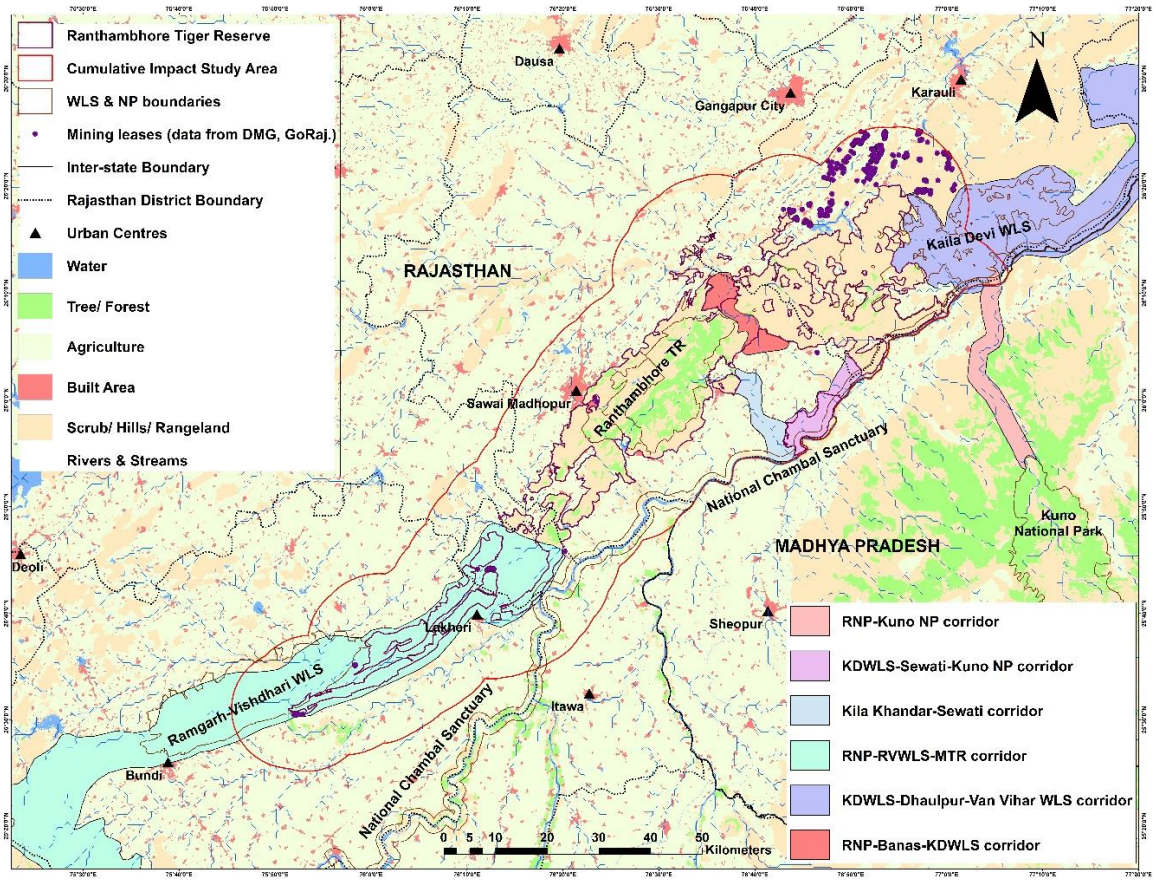

Figure 22: Map depicting the six (06) identified wildlife corridors in and around RTR whose protection and restoration is extremely important for the long-term persistence of all wildlife in the region

Sr. no.	Corridor name	Corridor length total (km)	Corridor area total (sq.km)	Connecting PAs/ Divisions	River within/ along corridor	Corridor length within CISA (km)	Corridor area within CISA (sq.km)
1	Kaila Devi – Sewati – Kuno	19.63	68.63	KDWLS, NCSP, RTR buffer	Chambal	19.63	26.02
2	Kila Khandar – Sewati	18.04	52.62	NCSP, RTR buffer	Banas	18.52	56.5
3	Kaila Devi – Kuno	32.32	106.08	KDWLS, NCSP, Kuno NP (MP)	Kuno	4.21	4.48
4	Ranthambhore – Ramgarh-Vishdhari – Mukundara	207.71	2827.28	RTR core, RVTR, MTR	Mej	64.71	419.08
5	Ranthambhore – Banas – Kaila Devi	16.56	60.05	RTR core, RTR buffer (KDWLS)	Banas	8.5	43.05
6	Kaila Devi – Dhaulpur – Van Vihar	120.95	1424.78	KDWLS, (proposed) Dhaulpur TR, Van Vihar WLS	Chambal	19.36	181.26
TOTAL		**415.21**	**4539.44**			**134.93**	**730.39**

Table 12: Details of the six (06) wildlife corridors in the Ranthambhore landscape

6. RESULTS & DISCUSSION

6.1 Critical and Non-Critical Zones within CISA

Unregulated and poorly appraised mining activities, along with other anthropogenic disturbances, can have wide-ranging impacts (detailed in previous chapters) on the movement patterns and occupancy of wild animals and threaten various ecosystems in the impact zone. Hence, we use existing data detailed in sections 1 and 5 of this report to delineate "*critical zones*" for wildlife and "*non-critical*" zones within the Cumulative Impact Study Area (Figure 30) to facilitate decision-making authorities in arriving at informed proposal appraisals.

Following the methodology described earlier, and combining four components within CISA together – Protected Areas (WLS & NP), Eco-Sensitive Zones (legally valid, as on date of submission) around them, Wildlife Corridors and selected threatened/ Sch. I species' occurrence & (modelled) suitable habitat/ distribution – a total area of **2136.7 sq.km (or 56.26%)** within the total 3798.1 sq.km in the CISA is deemed as "***critical zone***" for wildlife in a 10 km-radius width landscape around RTR in Rajasthan (Figures 23 & 24, Table 13).

The critical zone for wildlife thus delineated as a result of this study is a conservative estimate at best, considering the following limitations.

1. Although the modelled suitable habitat data for the aforementioned RET/ Sch. I species have been provided in the form of fine scale 1 sq.km grids, actual occupancy of wild animals is not known due to lack of detailed ecological investigations outside RTR limits.
2. Detailed wildlife movement (except of the last one year of tiger movement and/ or kill reports by RTR-II and RVTR Divisions) and human-wildlife conflict data (of the last 10 years) carrying geo-coordinates were not provided by the RJFD despite WII's request, thereby hindering our ability to generate more accurate results.
3. Cheetah *Acinonyx jubatus* has been introduced into the neighbouring Kuno National Park, and could establish itself in the CISA which comprises of large tracts of rangelands, suitable for the species' use. Hence, appraising proposals in this landscape without following the precautionary principle might hinder its ability to establish a viable metapopulation in the western/ central Indian landscape.

A non-critical zone of **1,661.4 sq.km (or 43.74%)** with regard to inhabiting wildlife, given the limitations described above, is also delineated where mining (or other development activities) may be permitted subject to comprehensive, site-specific or (wherever relevant) cumulative appraisal of such proposals in order to ensure sustainable mining alongside meeting wildlife and forest conservation goals.

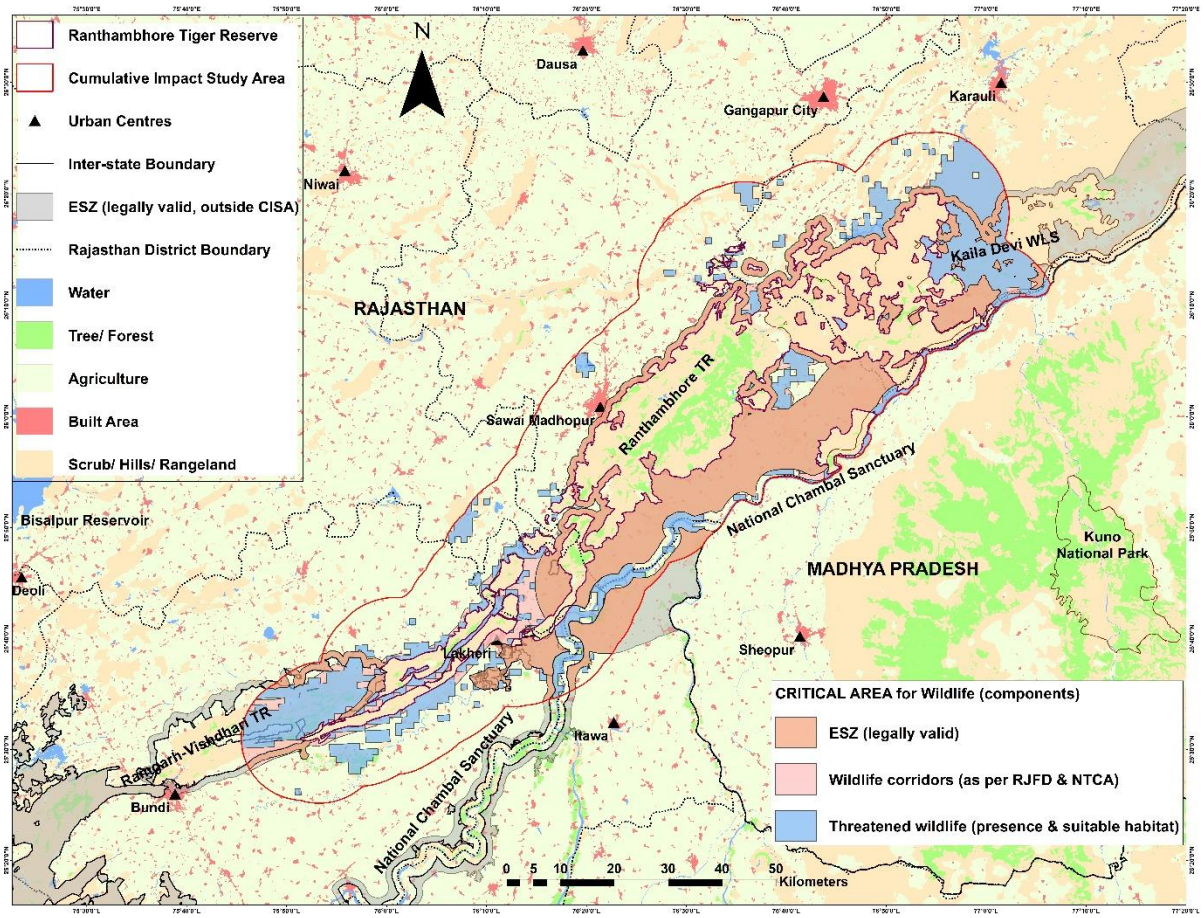

Figure 23: Map showing various component layers/ information used towards delineating a "*critical zone*" for wildlife within the CISA; the Protected Areas of Kaila Devi WLS (portion that is not part of RTR), National Chambal Sanctuary Project, Rajasthan and Ramgarh-Vishdhari WLS within the CISA are also included in the delineated "*critical zone*" for wildlife

Sr. no.	Components within CISA	Area (in sq.km) within CISA
1	Protected Areas (WLS & NP)	523.099
2	Eco-Sensitive Zones (legally valid)	1137.269
3	Wildlife corridors	726.312
4	Threatened/ Sch. I species' occurrence & modelled suitable habitat	1300.01
TOTAL *"Critical Zone" for Wildlife*		***2136.7***
"Non-Critical Zone"		***1661.4***
Cumulative Impact Study Area (CISA)		***3798.1***

Table 13: Extents of various components used to delineate a composite "*critical zone*" for wildlife in the Cumulative Impact Study Area around RTR's vicinity in Rajasthan

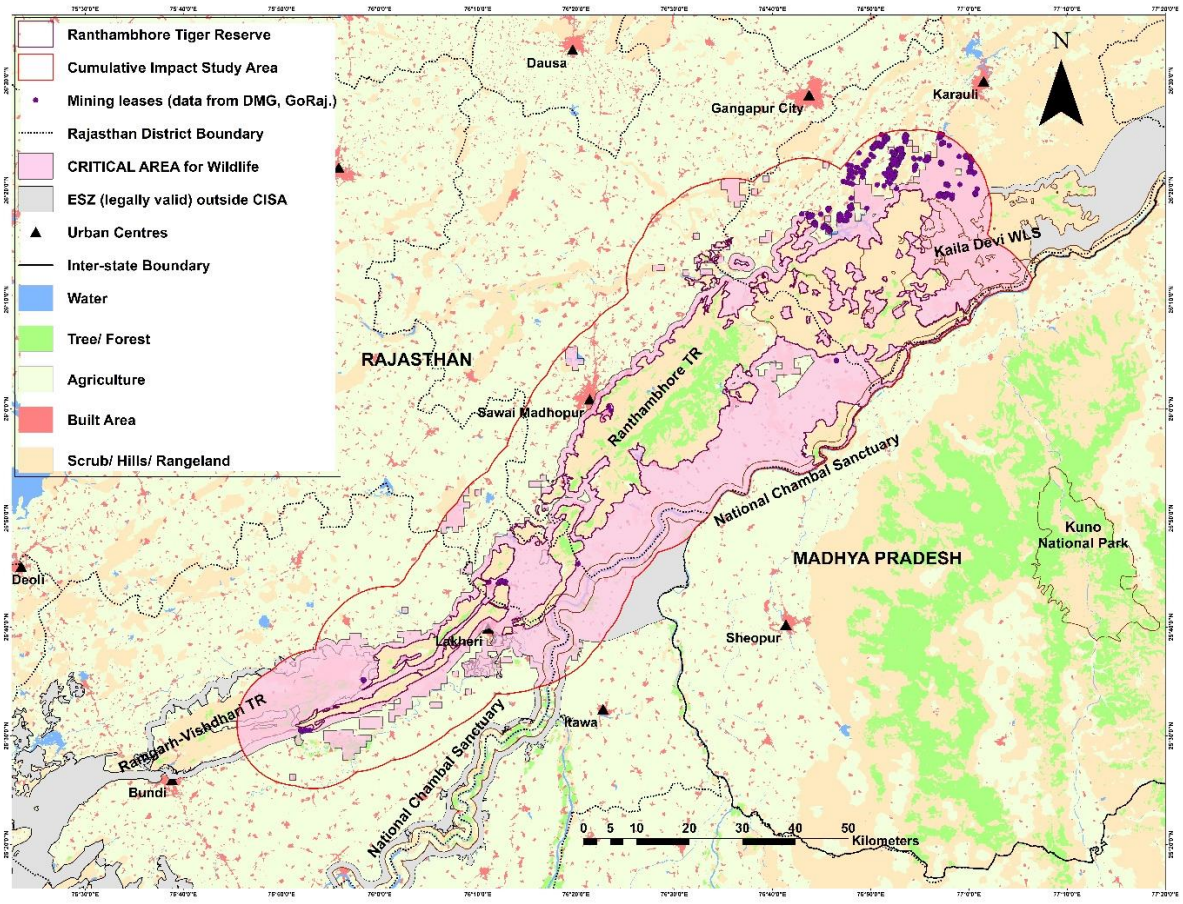

Figure 24: "*Critical zone*" for wildlife (areas shaded in pink) in Ranthambhore Tiger Reserve's ten (10) km-width vicinity within Rajasthan overlaid with mining leases locations

6.2 Assessment of two (02) Mining proposals under SC-NBWL's consideration

Upon the delineation of the "critical zone" for wildlife, we then overlaid the polygon KML files of the two mining proposals under the SC-NBWL's consideration awaiting appraisal.

i. Proposed Silica sand mining project M.L.No.09/2003 (4.2682 Ha) in Village Manoharpura, District Karauli of M/s Rama Minerals **(*FP/RJ/MIN/4863/2020*)**;

ii. Proposed Silica sand and Masonry stone mining project M.L.No.06/1982 (23.1726 Ha) in Village Richhotti, District Karauli of M/s Kumar Herbals **(*FP/RJ/MIN/5863/2021*)**

The above two proposals are located 5.1 km and 8.2 km away from the nearest Protected Area (Kaila Devi WLS), respectively. Since even a Draft ESZ for KDWLS or RTR has not yet been notified by the MoEF&CC (proposal from the Govt. of Rajasthan returned due to certain incomplete information), the proposals require SC-NBWL's appraisal by virtue of them being within 10 km of Kaila Devi WLS. However, the proposals do not fall within any of the components used to determine a composite "critical area" for wildlife in this study (Figure 25) (but see limitations described in Section 6.1). Hence, they may be positively appraised alongside the commissioning of recommended and detailed environment, wildlife and biodiversity (site-specific or cumulative) impact studies in the landscape/ impact zone. We have also gone through their submitted mining plans, and given our understanding of the various laws, rules and policies regarding mining and conservation currently in force, have made the following observations (Table 14).

Rama Minerals (FP/RJ/MIN/4863/2020)	Kumar Herbals (FP/RJ/MIN/5863/2021)
• Stripping ratio is an important parameter in any open pit mining operation, with respect to ensuring sustainable waste management practices. This ratio is not given in the Mining Plan. • Slope angle of the mining pit is an important parameter related to slope stability. Slope failure due to unstable slopes (due to various factors, including inadequate design) may cause loss of life and machinery/equipment. Slope failure may also result in significant changes in land structure and could interfere with the natural course of waterbodies. Hence, it is important to discuss aspects and details regarding slope stability in the Mining Plan. • The Mining Plan gives no information on faunal diversity of the area. • Sufficient information on flora (in one single line) within the lease/impact area is not provided.	• All basic information of a mining plan given, including mineral reject/ dump plan, stripping ratio, size of the pit with slope angles, post mine reclamation plan has been made available. • Insufficient information on flora and fauna in the lease area/ impact zone with only six (06) species of flora and eight (08) species of fauna listed.

Table 14: Observations regarding certain desirable information in the Mining Plans of proposals under SC-NBWL's consideration awaiting appraisal

6.3 Mining Leases within "Critical Zone" for Wildlife around RTR's vicinity

As detailed in the Methodology section, we requested for and obtained records of mining leases purportedly located within a 10 km radius-width of the Ranthambhore Tiger Reserve (RTR) through the DMG offices of Karauli, Sawai Madhopur, Bundi and Kota as portable document files (pdf) with information such as mining lease (ML) nos. and geo-coordinates of either one or several pillars. The mining official at DMG Tonk verbally informed the WII research team that there were no mining leases within 10 km-radius of RTR in Tonk. It must be noted though that mining officials at the district level with whom we interacted may not always understand what RTR means and may have variously interpreted it as RTR Core Zone, RTR-I Division etc. For the purposes of this study/ report, RTR has always comprised of both the Core and Buffer zones. Hence, we have reasons to believe that the supplied information to us may not be comprehensive. We are also unsure of the number of leases operational/ expired as of today.

We digitised the obtained records – totalling 145 leases with unique ML nos. – and have overlaid them on all relevant maps and figures in this report. Three separate clusters of mining operations are identified, and their maps are provided below (Figures 25-27). Through basic extraction analyses performed in ArcMap 10.6, we have been able to collate and present information regarding 60 mining leases within CISA that are located within either of legally-valid ESZs, wildlife corridors, or in areas with threatened wildlife presence/ distribution (Table 15). It is hoped that the relevant governing and regulating authorities, including SC-NBWL, MoEF&CC and RJFD, will take necessary and appropriate action, as may be feasible and advisable for wildlife conservation.

SN	District	ML no. (short)	Latitude	Longitude	Min. dist. (km) from RTR	Within ESZ	Within WL corridor	Threatened species occurrence/ suitable habitat
1	Karauli	1/1973	26.35235	76.80320	7.13	No	No	WLF
2	Karauli	12/1976	26.33547	76.87729	0.55	RTR (proposed)	No	No Data
3	Karauli	2/1981	26.34194	76.98472	5.63	No	No	LPD, SLB, WLF, DHL, PGN
4	Karauli	2/1981	26.32778	76.95083	1.96	No	No	WLF
5	Karauli	1/1984	26.30591	76.82667	2.53	No	No	SLB, WLF, PGN
6	Karauli	5/1985	26.28336	76.73633	0.41	RTR (proposed)	No	No Data
7	Karauli	25/1989	26.36058	77.00036	7.88	No	No	WLF
8	Karauli	16/1989	26.36058	77.00036	7.88	No	No	WLF
9	Karauli	2/1990	26.27180	76.76160	2.05	No	No	WLF
10	Karauli	2/1992	26.29001	76.78479	2.91	No	No	WLF
11	Karauli	70/1998	26.41772	76.95583	9.16	No	No	WLF
12	Karauli	11/2000	26.28707	76.78054	2.73	No	No	WLF
13	Karauli	3/2000	26.27163	76.76421	1.88	No	No	WLF
14	Karauli	58/2001	26.37825	76.92886	4.50	No	No	WLF
15	Karauli	138/2001	26.38068	76.93028	4.78	No	No	WLF
16	Karauli	35/2002	26.37933	76.92785	4.58	No	No	WLF
17	Karauli	69/2002	26.37786	76.92722	4.43	No	No	WLF
18	Karauli	8/2002	26.38999	76.87351	5.77	No	No	WLF, SLB
19	Karauli	74/2004	26.38999	76.87351	5.77	No	No	WLF, PGN
20	Karauli	105/2004	26.37324	76.95331	5.23	No	No	WLF
21	Karauli	9/2006	26.34200	76.96089	3.57	No	No	CAR
22	Karauli	20/2007	26.40378	76.95321	7.79	No	No	WLF, SLB, PGN
23	Karauli	24/2008	26.29714	76.72639	0.60	RTR (proposed)	No	No Data
24	Karauli	26/2008 (Minor B)	26.39131	76.86919	6.02	No	No	WLF
25	Karauli	26/2008	26.32720	77.01059	7.60	No	No	WLF
26	Karauli	16/2010	26.29714	76.71676	0.76	No	No	LPD, WLF
27	Karauli	16/2010	26.29290	76.72847	0.45	RTR (proposed)	No	LPD, WLF, DHL, PGN
28	Sawai Modhopur	54/1985	26.00359	76.38885	0.16	RTR (proposed)	No	LPD, WLF
29	Sawai Modhopur	1/1998	25.99724	76.39274	0.22	RTR (proposed)	No	LPD, WLF
30	Sawai Modhopur	67/2004	26.07425	76.77499	0.91	NCSP (legally valid)	No	WLF

SN	District	ML no. (short)	Latitude	Longitude	Min. dist. (km) from RTR	Within ESZ	Within WL corridor	Threatened species occurrence/ suitable habitat
31	Sawai Modhopur	68/2004	26.07366	76.77544	0.97	NCSP (legally valid)	No	No Data
32	Sawai Modhopur	87/2006	25.76336	76.33664	0.42	RTR (proposed)	No	TIG, LPD, WLF, DHL
33	Sawai Modhopur	1/2007	26.07425	76.77499	0.91	NCSP (legally valid)	No	No Data
34	Bundi	389/1998	25.58521	75.97314	1.12	RVTR (proposed)	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
35	Bundi	333/2002	25.50919	75.86608	0.44	RVTR (proposed)	Ranthambhore – Ramgarh-Vishdhari – Mukundara	No Data
36	Bundi	369/2005	25.50933	75.87381	0.47	No	No	No Data
37	Kota	76/1996	25.73511	76.21164	0.19	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
38	Kota	30/1996	25.73573	76.20325	0.33	No	No	No Data
39	Kota	62/1996	25.73674	76.20674	0.23	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
40	Kota	63/1996	25.73642	76.20768	0.17	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
41	Kota	10/1997	25.73593	76.20854	0.14	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
42	Kota	152/1998	25.73579	76.20954	0.17	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
43	Kota	47/1999	25.73402	76.21289	0.14	No	No	No Data
44	Kota	63/2000	25.73620	76.20521	0.26	No	No	No Data
45	Kota	64/2000	25.73678	76.20889	0.23	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
46	Kota	65/2000	25.73530	76.21041	0.16	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
47	Kota	69/2001	25.73678	76.20889	0.23	No	No	No Data
48	Kota	72/2001	25.73758	76.20709	0.30	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
49	Kota	64/2001	25.73494	76.21298	0.23	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
50	Kota	68/2001	25.73599	76.21181	0.28	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF

SN	District	ML no. (short)	Latitude	Longitude	Min. dist. (km) from RTR	Within ESZ	Within WL corridor	Threatened species occurrence/ suitable habitat
51	Kota	62/2001	25.73353	76.20139	0.23	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, CAR, WLF
52	Kota	67/2001	25.73726	76.20803	0.26	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
53	Kota	70/2001	25.73663	76.20989	0.26	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
54	Kota	65/2001	25.73709	76.20504	0.35	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, CAR, WLF
55	Kota	61/2001	25.73408	76.20218	0.24	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, CAR, WLF
56	Kota	71/2001	25.73614	76.21076	0.25	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF
57	Kota	23/2003	25.73563	76.18538	0.13	RTR (proposed)	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD
58	Kota	16/2004	25.73642	76.21360	0.39	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, CAR, WLF
59	Kota	17/2005	25.73399	76.20288	0.20	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, CAR, WLF
60	Kota	100/2006	25.73516	76.20439	0.22	No	Ranthambhore – Ramgarh-Vishdhari – Mukundara	LPD, WLF

Table 15: Details of sixty (60) mining leases lying within the "*critical zone*" for wildlife around RTR's 10 km-radius vicinity identified in this exercise; of these 60 leases, 13 leases are located within the legally valid ESZ while 22 are located within the Ranthambhore – Ramgarh-Vishdhari – Mukundara corridor connecting the three tiger reserves in the landscape; *TIG = tiger, LPD = leopard, CAR = caracal, WLF = Indian wolf, DHL = dhole, SLB = sloth bear, PGN = Indian pangolin*

Sr. no.	District	"Critical Zone" for Wildlife (sq.km) within CISA	Non-Critical Zone (sq.km) within CISA	TOTAL
1	Karauli	525.778	338.553	864.331
2	Sawai Madhopur	746.278	599.479	1345.757
3	Tonk	25.498	114.763	140.261
4	Bundi	520.258	568.241	1088.499
5	Kota	295.368	40.367	335.735
TOTAL		**2113.18**	**1661.403**	**3774.58**

Table 16: District-wise "*critical*" and non-critical zones

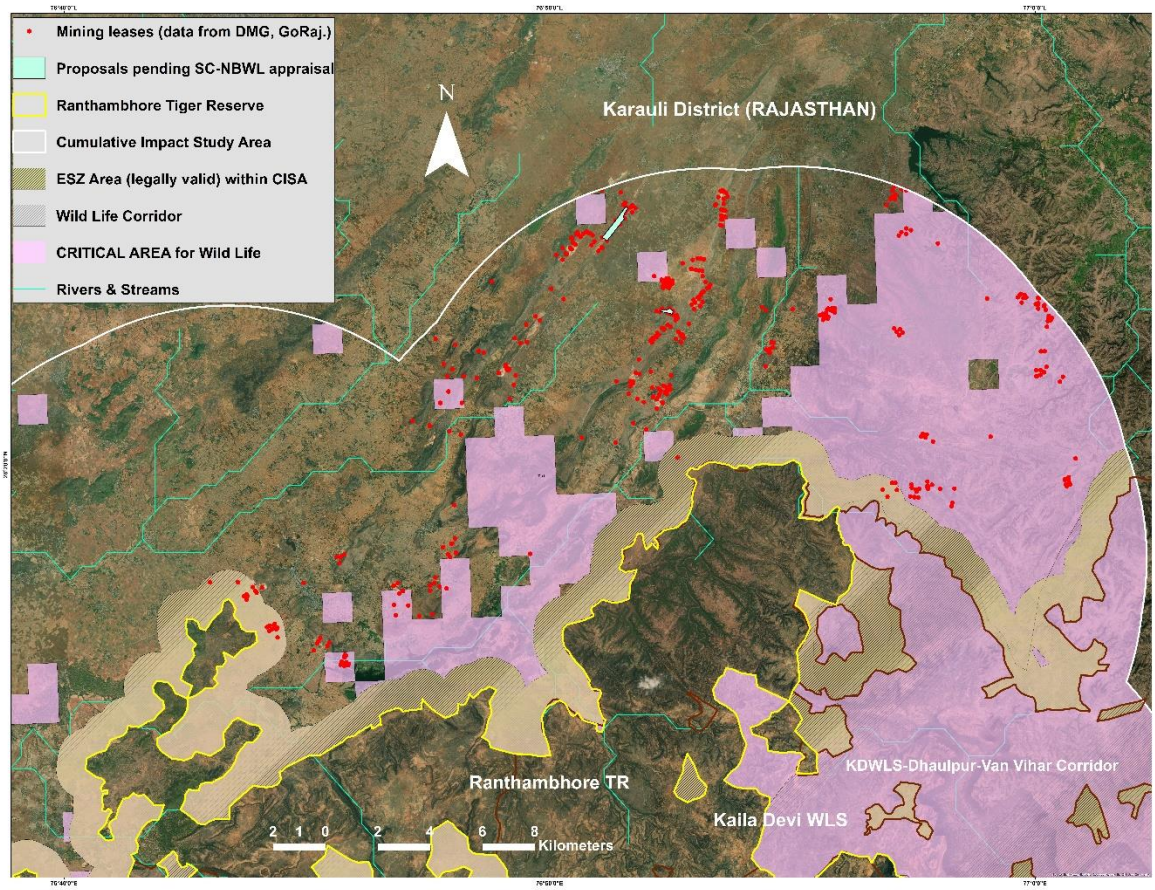

Figure 25: Karauli district is a mining hotspot and several mining leases lie within RTR's Proposed ESZ or within/ in very close proximity to threatened species' suitable habitats (see Table 15 for details)

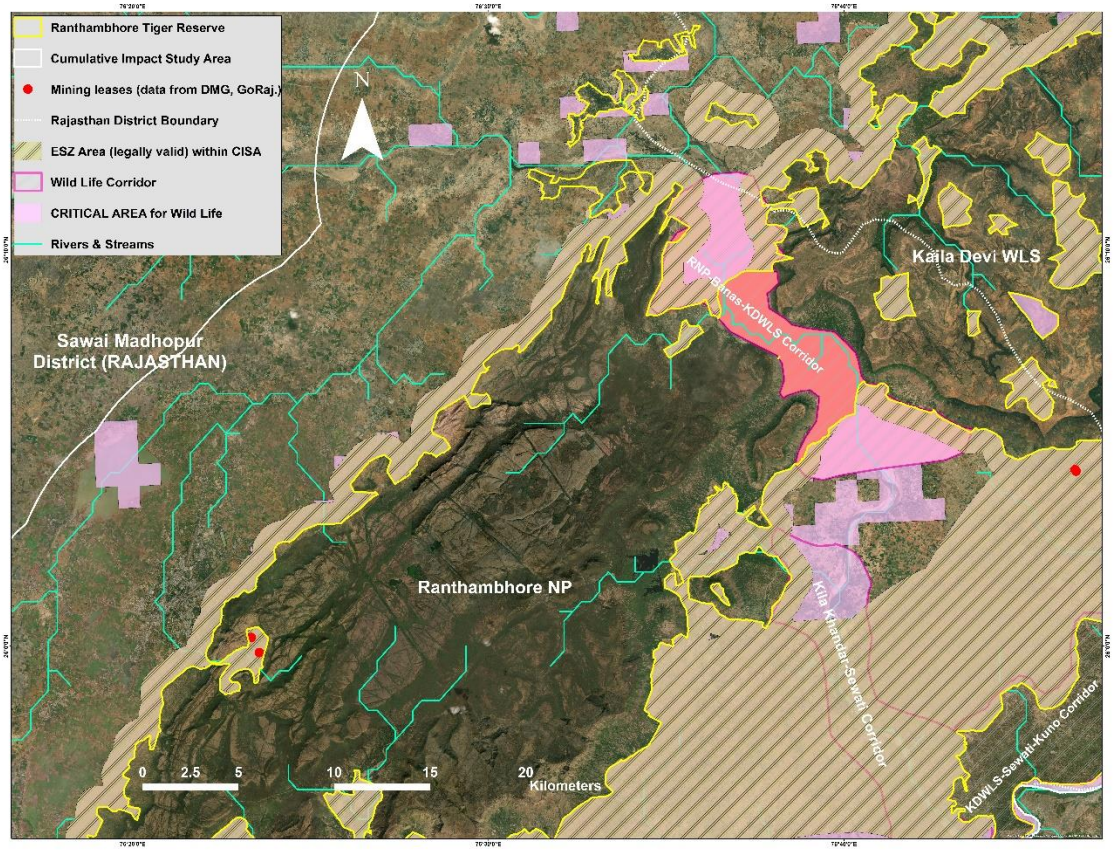

Figure 26: Few mining leases are located within RTR's Proposed ESZ or within NCSP's legally valid ESZ (see Table 15 for details)

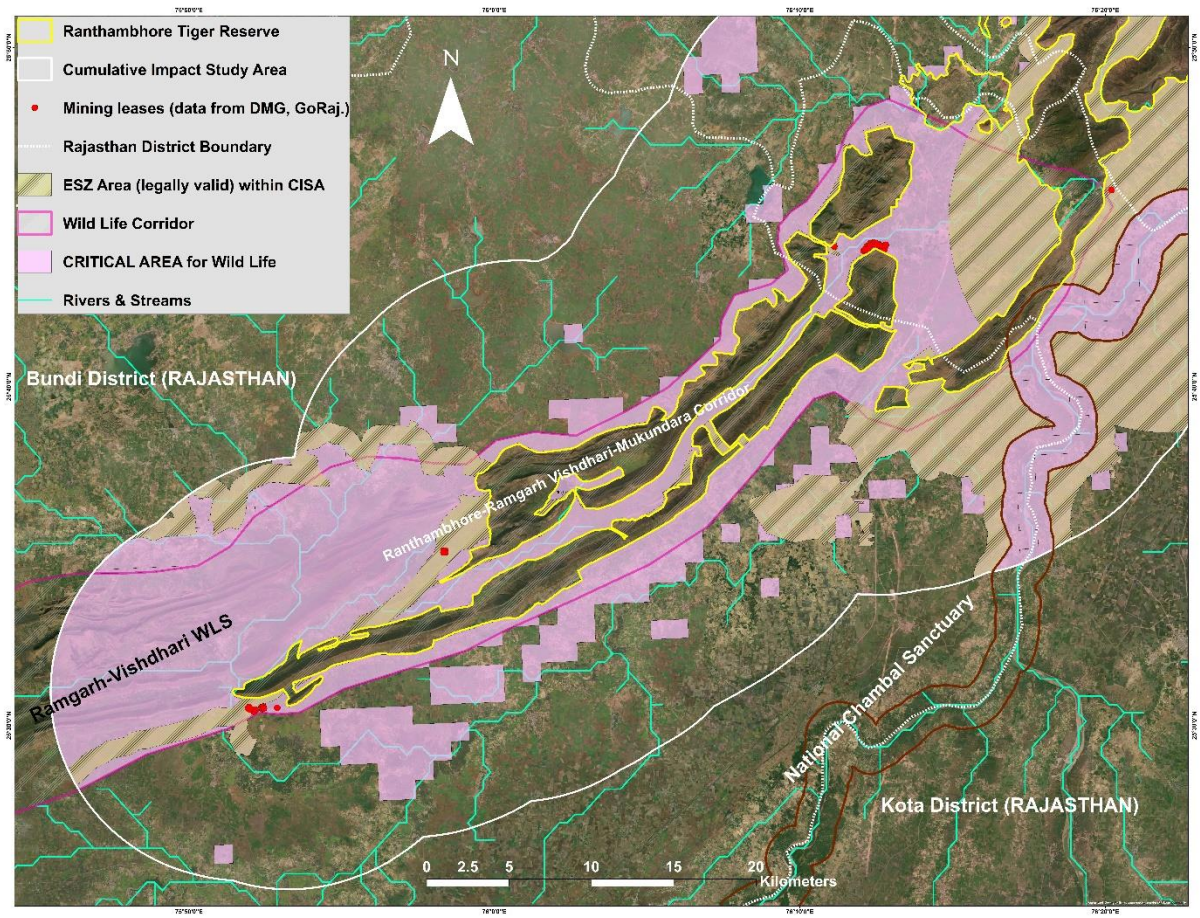

Figure 27: Few mining leases are located within RVTR's Proposed ESZ or within NCSP's legally valid ESZ in Bundi and Kota districts (see Table 15 for details)

7. RECOMMENDATIONS

Rajasthan is blessed with two of the oldest hill ranges – Aravallis and Vindhyas – skirting its eastern boundaries and creating conditions and suitable habitat for the survival of several wildlife species adapted to the semi-arid climate and undulating terrain in and around Ranthambhore interspersed by large areas of flat rangelands. Although the tiger is the flagship species, the landscape is the preferred habitat of several locally rare species such as the Indian wolf, caracal, striped hyaena, desert fox and the likes, alongside several other flora and fauna groups. Rajasthan is also blessed with several mineral reserves, the sustainable harvesting of which could potentially strike a balance between the imperatives of economic growth and wildlife conservation. The following recommendations are based on and derived from our detailed reading and analyses of already existing guidelines and observations/ directions of various higher courts of judicature towards making mining a more sustainable and environment-friendly enterprise.

We also suggest a few scientific studies that urgently need to be carried out in order to enable statutory decision-making authorities such as the SC-NBWL to make more informed proposal appraisals towards incorporating wildlife conservation considerations.

i. Scientific studies to facilitate informed decision-making

1. Since the current exercise is limited by availability of requisite data on wildlife species occurrence and distribution due to a general lack of scientific investigations outside of RTR, it is extremely important that comprehensive wildlife diversity, distribution, movements, human-wildlife interactions and other such studies are undertaken, so that a more useful delineation of critical zones for wildlife around RTR may be taken up in the future, incorporating ecological information of not only large mammals but of several other threatened taxa as well.
2. Wildlife use and movement along with assessing anthropogenic pressures within and around identified animal corridors are crucial towards drafting corridor restoration strategies to permit unencumbered wildlife movement from one PA to the other in the larger Ranthambhore landscape.

ii. Recommendations specific to the CISA around RTR

1. Mining leases not falling within ESZ or wildlife corridors may only be extended/ permitted after commissioning detailed site-specific and cumulative (wherever relevant) environment and biodiversity impact studies.
2. All mining leases – either currently operational or pending statutory appraisal – located within the legally valid ESZ and in wildlife corridors may be rejected; it is also important that the ESZs of RTR, RVTR and NCSP, Rajasthan are finalised as early as possible following existing guidelines on the matter and as per relevant orders of higher courts of judicature in this regard.
3. Similarly, all mining leases – either currently operational or pending appraisal – located within the occurrence/ suitable habitat zones of globally threatened and Sch. I species of prime conservation concern such as tiger, leopard, caracal, wolf, dhole, sloth bear, Indian pangolin etc. may not be positively appraised to allow for wildlife use of these areas.
4. Mining leases not falling within ESZ or wildlife corridors may only be extended/ permitted after commissioning detailed site-specific and cumulative (wherever relevant) environment and biodiversity impact studies.

iii. Recommendations to promote sustainable, just and scientific mining practices around RTR

1. To reduce the risk of silicosis with the use of silica sand, alternative foundry sands can be considered such as olivine which does not contain any free silica and is less toxic than silica sand (Davis, 1979). It is used in sand blasting to avoid the risk of silicosis (Indian Minerals Yearbook 2014). Another substitute is chromite, which is considered a green raw material in foundry industry. It generates less fine particles and thus, less new sand is needed to add on to the system. On the contrary, silica sand generates fines at a faster rate than chromite sand under thermal and mechanical stress which could be due to its higher coefficient of thermal expansion property (Kabasele & Nyembwe, 2021). Zircon is also another free silica mineral that is used as a refractory material and foundry sand (Pirkle & Podmeyer, 1993). Other basic and neutral refractories include magnesite, mag-chrome, dolomite and high

alumina bricks, which have replaced silica in a large number of applications (Indian Minerals Yearbook, 2014).

2. A closed loop system or waterless mining is a mining system where freshwater is initially needed, but can further be reused and recycled consistently within a closed system. This reduces unnecessary withdrawal of large amount of freshwater for mining as well as the amount of untreated water discharge; thereby saving time, energy and other resources. Some global mining companies such as Anglo American, successfully meets two-third of its operational water requirement from closed loop system. Such systems can be adopted, but only after proper environmental assessments within the context of particular mining sites.
3. Most of the open cast mining in India is carried based upon empirical and observational approaches. However, there are more scientific ways to assess the mining features such as rock slope stability. One such alternate approach for the slope stability analysis can be the use of numerical modeling software such as Fast Lagrangian Analysis of Continua (FLAC), Universal Distinct Element Code (UDEC) and Galena. These numerical modelling softwares simulate slop failure behaviour and deforming materials which helps to prevent and eliminate risks involved in slope designs. Such designs should be adopted, encouraged by statutory bodies and they should be a part of the mining plan (Prakash, 2009).
4. Mining operations should look for alternate renewable sources of energy to generate electricity for their functioning, following proper environmental assessments. Successful implementation of such methods such as solar, hydrological and wind energy etc. can help to promote sustainable mining, leaving long term positive impacts on the environment.
5. To minimise the impact of large amounts of overburden dump on the environment and ensure minimum input of water in the mining system, advanced washing and beneficiation technology such as CDE Asia's "Combo Exo" (launched on September 17, 2020) can be adopted. It was adopted by Balaji Quartz Pvt. Ltd, one of the largest quartz mines in Rajasthan to improve their production with better washing and fines removal system. Earlier, the company had a dysfunctional dry screening and washing system which was labour intensive, not thorough with the washing of quartz lumps and with no means to recycle water, wastage was also at maximum affecting their output quality. Combo Exo helped the company to achieve different industrial grades of quartz and segregate the output into different sizes according to industry's standard. Through the use of this customised plant, wastage is also converted to M-sand, thereby reducing and eliminating the wastage at dumps considerably (https://cdeasia.com/case-studies/balaji-quartz-rajasthan).

Implementation of these recommendations and of already existing relevant mining laws, guidelines and policies will involve on-ground, timely and transparent monitoring by the State government using all available modern technology and trained manpower to monitor the compliances by project proponents and to check if all relevant guidelines are being strictly followed or not. This will ensure the protection of Rajasthan's immense natural and mineral wealth to ensure holistic development for her people and wildlife.

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	2. No work shall be done before sunrise and after sunset in the project area. 3. No material of any kind should be extracted from the Protected Area. 4. There will be no felling of trees and burning of fuel wood inside the Protected Area. 5. The waste material generated should be disposed outside the Protected Area. 6. There will be no labour camp within 1 km from the boundary of Protected Area. 7. No blasting will be carried out within 1 km from the boundary of Protected Area during the work. 8. Green belt should be created by the User Agency on the periphery of the project area. 9. Water Harvesting Structure for recharging of water should be mandatory in the project area. 10. There shall be no high mast/ beam/search lights & high sounds within 1 km from the Protected Area boundary. 11. Signages regarding information about the wild animals in the area, control of the traffic volumes, speed etc. should be erected in the project area. 12. The user agency and project personnel will comply with the provisions of the Wild Life (Protection) Act, 1972. 13. Maintenance activity of any nature should be carried out only after seeking formal approval from competent authority of tiger reserve/PA. 14. Any permission/clearance required under FCA-1980 or other acts may be taken as per rules. 15. All plastic material like polythene bags and other waste material should be disposed of outside the sanctuary area. 16. All tourism activities will be run only in day time (sunrise to Sunset). 17. No night camping will be allowed for any tourism activity. 18. An annual compliance certificate on the stipulated conditions shall be submitted by the project proponent to the State Chief Wild Life Warden and an annual compliance certificate shall be submitted by the State Chief Wild Life Warden to Government of India.
70.4.38	Proposed Silica Sand mining project ML.No.09/2003 (Area 4.2682 Ha) in village- Manoharpura, Tehsil, district-Karauli of M/s Rama Minerals. **FP/RJ/MIN/4863/2020** The Standing Committee was informed that the proposal is for use of 4.2682 ha Silica Sand mining project ML.No.09/2003 (Area 4.2682 Ha) in village-Manoharpura, Tehsil, district-Karauli of M/s Rama Minerals. Proposed site is 5.1 Km away from the Kaila Devi Wildlife Sanctuary (WLS) which is a part of Ranthambhore Tiger Reserve. The proposal has been recommended by the Chief Wild Life Warden, State Board for Wild Life and the State Government of Rajasthan.

	The Chief Wild Life Warden, Rajasthan informed that the proposal for declaration of ESZ around Ranthambore Tiger Reserve was forwarded by the State Government to Government of India over which clarifications were sought by the Ministry. The proposal has been revised in line with the order of Hon'ble Supreme Court of India dated 3rd June, 2022 for notifying minimum one km ESZ around the tiger reserve and submitted by the Forest Department to the State Government. It will be forwarded soon to the Government of India. Dr. H. S. Singh said that the proposal may be considered for recommendation if it does not have any impact on the river systems in the area. Director, Wildlife Institute of India said that mining activities were being carried out at many places around the Ranthambore Tiger Reserve and a cumulative impact study needs to be carried out to determine areas where mining can be allowed. **Decision Taken:** After discussions, the Standing Committee decided to defer the proposal till the submission of proposal for declaration ESZ around Ranthambore Tiger Reserve. The Standing Committee also directed that a cumulative impact study be carried out by Wildlife Institute of India in order to determine areas where mining can be allowed around Ranthambore Tiger Reserve.
70.4.39	Proposed Richhoti silica sand and masonry stone mine M.L.No.06/1982 M/s Kumar Herbals & Silica, Rajasthan. **FP/RJ/MIN/5863/2021** The Standing Committee was informed that the proposal is for use of 23.1726 ha Richhoti silica sand and masonry stone mine M.L.No.06/1982 M/s Kumar Herbals & Silica, Rajasthan. Proposed site is 8.2 Km away from the Kaila Devi Wildlife Sanctuary which is part of Ranthambhore Tiger Reserve (RTR). The proposal has been recommended by the Chief Wild Life Warden, State Board for Wild Life and the State Government of Rajasthan. The Chief Wild Life Warden, Rajasthan informed that the proposal for declaration of ESZ around Ranthambore Tiger Reserve was forwarded by the State Government to Government of India over which clarifications were sought by the Ministry. The proposal has been revised in line with the order of Hon'ble Supreme Court of India dated 3rd June, 2022 for notifying minimum one km ESZ around the tiger reserve and submitted by the Forest Department to the State Government. It will be forwarded soon to the Government of India.

	Dr. H. S. Singh said that the proposal may be considered for recommendation if the same does not have any impact on the river systems in the area. Director, Wildlife Institute of India said that mining activities were being carried out at many places around the Ranthambore Tiger Reserve and a cumulative impact study needs to be carried out to determine areas where mining can be allowed. **Decision Taken:** After discussions, the Standing Committee decided to defer the proposal till the submission of proposal for declaration ESZ around Ranthambore Tiger Reserve. The Standing Committee also directed that a cumulative impact study be carried out by Wildlife Institute of India in order to determine areas where mining can be allowed around Ranthambore Tiger Reserve.
70.4.40	Proposal for use of 18.083 Ha of forest land default ESZ of Pranahita Wildlife Sanctuary for execution of left flank main canal and 8-R distributary for Nilwai Medium Irrigation project in Mancherial district (Package No.12) in favour of Executive Engineer, Irrigation Department, MIP Division, Mancherial, Telangana. **FP/TG/IRRIG/30173/2017** The Standing Committee was informed that the proposal is for use of 18.083 Ha of forest land default ESZ of Pranahita Wildlife Sanctuary for execution of left flank main canal and 8-R distributary for Nilwai Medium Irrigation project in Mancherial district (Package No.12) in favour of Executive Engineer, Irrigation Department, MIP Division, Mancherial, Telangana. The proposed site is 6.64 Km away from Pranahitha Wildlife Sanctuary. The proposal has been recommended by the Chief Wild Life Warden, State Board for Wild Life and the State Government of Telangana. The works related to the project proposal have been carried out and there is violation of Forest (Conservation) Act, 1980. The Chief Wild Life Warden, Telangana informed that Stage I Clearance under Forest (Conservation) Act, 1980 has been received for the project and penal compensatory amount for afforestation over 14 ha of land has been received from the user agency. The works have been stopped by the Forest Department. The reservoir has been constructed over 550 ha of forest land after permission under Forest (Conservation) Act, 1980 and the canal construction works are pending for recommendations from the Standing Committee. Dr. H. S. Singh said that the area has presence of tigers, leopards and other wild animals. He pointed out that the proposal is not accompanied by a suitable animal passage plan prescribing structures for enabling crossing of

F.No.6-175/2022 WL
Government of India
Ministry of Environment, Forest and Climate Change
(Wildlife Division)

2nd Floor, Prithivi Wing,
Indira Paryavaran Bhawan,
Jor Bagh Road, New Delhi 110003.

Date: 03rd November, 2022

To,

Director,
Wildlife Institute of India,
Chandrabani, Dehradun-248001.

Sub 1: Proposed Silica Sand mining project ML.No.09/2003 (Area 4.2682 Ha) in village- Manoharpura, Tehsil, district-Karauli of M/s Rama Minerals. - FP/RJ/MIN/4863/2020.

Sub 2: Proposed Richhoti silica sand and masonry stone mine M.L.No.06/1982 M/s Kumar Herbals & Silica, Rajasthan. Proposed site is 8.2 Km away from the Kaila Devi Wildlife Sanctuary which is part of Ranthambhore Tiger Reserve (RTR)-FP/RJ/MIN/5863/2021.

Sir,

Reference is invited to the subject mentioned above. The above proposals were discussed in the 70th Meeting of Standing Committee of National Board for Wild Life held on 13th October, 2022 under the Chairmanship of Hon'ble Minister for Environment, Forest & Climate Change.

2. After discussions, the Standing Committee decided that a cumulative impact study be carried out by Wildlife Institute of India in order to determine areas where mining can be allowed around Ranthambore Tiger Reserve.

3. The undersigned is therefore directed to request for carrying out the study as mentioned in the para '2' above and submission of report on or before 15th December, 2022.

Yours faithfully,

(Dr. Sudheer Chintalapati)
Scientist 'E'
Email: sudheer.ch@gov.in

Copy to:

1. Principal Secretary, Rajasthan Forest Department, Jaipur, Rajasthan - with a request to provide requisite assistance to the Wildlife Institute of India for carrying out the above study
2. Chief Wild Life Warden, Aranya Bhawan, Jhalana Institutional Area, Jaipur 302004 for information and necessary action

(Dr. Sudheer Chintalapati)
Scientist 'E'
Email: sudheer.ch@gov.in

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

(An Autonomous Institute under Ministry of Environment, Forest & Climate Change, Govt. of India)
पत्रपेटी सं0/Post Box No. 18, चन्द्रबनी, देहरादून/Chandrabani, Dehradun - 248001, उत्तराखण्ड, भारत/ Uttarakhand, INDIA

WII-EIA/CIA Study around Ranthambhore TR_149 **16 November 2022**

To,

Principal Secretary, Forest Department,
Van Bhawan, Vaniki Marg,
Jaipur 302 005, Rajasthan
Email: env_raj@yahoo.co.in

Sub: SC-NBWL directed Cumulative Impact Study to determine areas where mining can be allowed around Ranthambhore Tiger Reserve – reg.

Ref. MoEF&CC (WL Division) letter *F.No.6-175/2022 WL* dated 03.11.2022

Sir/Madam,

With reference to the aforementioned subject, and following an SC-NBWL decision during its 70th meeting, the Wildlife Institute of India (WII) has been requested by the Union MoEF&CC to conduct a Cumulative Impact Study to determine areas where mining can be allowed around Ranthambhore Tiger Reserve (RTR) within one month. The Union MoEF&CC vide above reference has requested the Principal Secretary, Rajasthan Forest Department to provide necessary assistance to the Wildlife Institute of India for carrying out this study.

In view of the above, we request that the following relevant information pertaining to Ranthambhore Tiger Reserve and its surrounding 10 km-radius landscape be kindly provided as soft and hard copies to WII at the earliest.

1. Shape and KML files of all Protected Areas (PAs) constituting RTR (including Ranges and beats) and their respective/combined Draft/Final Eco-sensitive Zones; shape and KML files of the core and buffer areas of RTR and that of any other Tiger Reserve in RTR's 10 km-radius vicinity.
2. Shape and KML files of neighbouring PAs (including Ranges and beats) in RTR's 10 km-radius vicinity and their respective Draft/Final Eco-sensitive Zones.
3. Shape and KML files of all Forest Divisions (including Ranges and beats) located in and around RTR's 10 km-radius landscape.
4. Shape (polygon) and KML files of all Village Forests, State Forests, Protected Forests, Reserved Forests etc. in and around RTR's 10 km-radius landscape.
5. Copies of approved Management Plans of PAs (including those constituting Tiger Reserves), Tiger Conservation Plans of relevant Tiger Reserves, and Working Plans of Forest Divisions in and around RTR's 10 km-radius landscape – especially all sections in each such Plan pertaining to listing/describing forest types, forest cover, habitats, LULC, flora, fauna, wildlife corridors etc., threats and issues concerning forests and wildlife, and all forest and wildlife conservation measures being undertaken and recommended to be undertaken towards their protection and conservation.
6. Shape (polygon) and KML files of identified and potential animal corridors – especially those used by tiger, leopard, sloth bear, and other such rare, endangered or threatened (RET) *Sch.I.* (under WLPA, 1972) species – in and around RTR's 10 km-radius landscape with relevant details and attributes.
7. Human-wildlife conflict data – including human and wildlife death/injury incidents, wildlife road kills, livestock injury/death due to wildlife, wildlife death due to livestock poisoning, crop damage/loss, property damage/loss etc. – with associated general and specific details such as geo-coordinates of the conflict location, Forest Division, village name, quantum of loss, ex-gratia compensation offered etc. in and around RTR's 10 km-radius landscape (in excel spreadsheets) in the last 10 years (2012-2022).

ई.पी.ए.बी.एक्स/EPABX : +91-135-2640114, 2640115, 2646100; फैक्स/ Fax : 0135-2640117 | ई-मेल/Email: wii@wii.gov.in वेब/ Website www.wii.gov.in Twitter: @wiiofficial1

8. Geo-coordinates of wildlife occurrences, especially of RET *Sch.I.* (under WLPA, 1972) species outside of Protected Areas in RTR's 10 km-radius landscape in the last 10 years (2012-2022).
9. Any other critical and important forested and aquatic habitats identified for wildlife (birds/mammals/fishes/herpetofauna/vegetation etc.) as shape (polygon) and KML files with relevant details and attributes.
10. Details of all mining projects (proposed/operational), linear infrastructure and other developmental projects situated/planned within 10 km from RTR along with their regulatory clearances' (EC/FC/WL) status, general details and shape/KML files, and details of such Forest Diversion proposals' compensatory afforestation (wherever applicable) plots including their KML files.
11. Occurrence and geographical spread of silica sand and masonry stone mineral reserves/deposits (or mineable areas) in and around RTR's 10 km-radius landscape as georeferenced maps, shape and KML files (one set of such files for each mineral).
12. Occurrence and geographical spread of other major and minor mineral reserves/deposits (or mineable areas) in and around RTR's 10 km-radius landscape as georeferenced maps, shape and KML files (one set of such files for each mineral).

As this is a time-bound task, the above information may kindly be shared with WII at the earliest. WII will commence work upon receipt of all the above information. You are also requested to instruct the concerned officers to provide necessary field and logistical support to the WII team while carrying out fieldwork/site-visit.

The required information may please be sent to dean@wii.gov.in with a copy to the Nodal Officer, EIA Cell, WII (eia@wii.gov.in).

Thanking you,

Yours sincerely,

(Dr. Ruchi Badola)
Dean, FWS (I/C) & Registrar

Copy for information and necessary action to:

1. Chief Wild Life Warden, Govt. of Rajasthan, Aranya Bhawan, Jhalana Institutional Area, Jaipur 302004. Email: pccf.cwlw.forest@rajasthan.gov.in
2. ADG (Wildlife) & Member-Secretary, SC-NBWL, Ministry of Environment, Forest & Climate Change, Indira Paryawaran Bhavan, Aliganj, Jor Bagh Road, New Delhi 110003. Email: adgwl-mef@nic.in
3. Dr. Sudheer Chintalapati, Scientist 'E', Ministry of Environment, Forest & Climate Change (WL Division), 2nd floor, Prithvi Wing, Indira Paryawaran Bhavan, Aliganj, Jor Bagh Road, New Delhi 110003. Email: sudheer.ch@gov.in
4. Dr. S. P. Yadav, Director, Wildlife Institute of India, Dehradun. Email: dwii@wii.gov.in
5. Dr. G. V. Gopi, Scientist-F & Nodal Officer, EIA Cell, Wildlife Institute of India, Dehradun. Email: gopigv@wii.gov.in, gopigv@gmail.com

APPENDIX 4 : CWLW, RJFD letter to Dean, WII, dated 16th December 2022

OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS
CHIEF WILDLIFE WARDEN RAJASTHAN, JAIPUR

No: F4(787)WLC/CWLW/2022/2075 Jaipur, Dated: 16/12/22

To,

Dean. FWS (I/C) & Registrar,
Wildlife Institute of India,
Chandrabani, Dehradun-248001.

Sub: SC-NBWL directed Cumulative Impact Study to determine areas where mining can be allowed around Ranthambhore Tiger Reserve – reg.

Ref: Your letter no. WII-EIA/CIA Study around Ranthambhore TR_149 dated 16.11.2022

Madam,

With reference to your request for details regarding Ranthambhore Tiger Reserve and its adjoining areas for carrying out the study as per decision of SC-NBWL in its 70th meeting, the following is submitted:

1. Most of the geographical information desired by you is available with the Tiger Cell at Wildlife Institute of India.
2. The other information sought by you is quite exhaustive in nature. It requires a dedicated team of scientists / researchers to compile the information after visiting the site.
3. The information available with the Department will be shared with the team deputed by you for this purpose. Hence it is requested that a team may be deputed urgently for timely completion of this work.

Dr Gopi
Sudhi 29/12/2022

Yours sincerely,

(Arindam Tomar)
Principal Chief Conservator of Forests
& Chief Wildlife Warden,
Rajasthan, Jaipur

No: F4(787)WLC/CWLW/2022 Jaipur, Dated:

Copy forwarded to for information and necessary action:

1. Principal Secretary of Forests, Govt. of Rajasthan, Jaipur.
2. Chief Conservator of Forests & Field Director, Ranthambhore Tiger Reserve, Swaimadhopur.

Principal Chief Conservator of Forests
& Chief Wildlife Warden,
Rajasthan, Jaipur

5. The waste material generated should be disposed outside the Protected Area.
6. There will be no labour camp within 1 km from the boundary of Protected Area.
7. No blasting will be carried out within 1 km from the boundary of Protected Area during the work.
8. There shall be no high mast/ beam/search Lights & high sounds within 1 km from the Protected Area boundary.
9. The user agency and project personnel will comply with the provisions of the Wildlife (Protection) Act, 1972.
10. Maintenance activity of any nature should be carried out only after seeking formal approval from competent authority of Tiger Reserve/PA.
11. The user agency and project personnel will comply with the provisions of Standard SOP/Guidelines issued by WII, Dehradun for linear projects.
12. Any permission/clearance required under FCA-1980 or other acts may be taken as per rules.
13. Power transmission line shall be laid underground in view of the Hon'ble Supreme Court order dated 19.04.2021 in Case No.838/2019.
14. An annual compliance certificate on the stipulated conditions shall be submitted by the project proponent to the State Chief Wild Life Warden and an annual compliance certificate shall be submitted by the State Chief Wild Life Warden to Government of India.

71.2.10 Proposed Silica Sand mining project ML.No.09/2003 (Area 4.2682 Ha) in village- Manoharpura, Tehsil, district-Karauli of M/s Rama Minerals.

FP/RJ/MIN/4863/2020

The Standing Committee was informed that the proposal is for use of 4.2682 ha Silica Sand mining project ML.No.09/2003 (Area 4.2682 Ha) in village Manoharpura, Tehsil, district-Karauli of M/s Rama Minerals. Proposed site is 5.1 Km away from the Kaila Devi Wildlife Sanctuary (WLS) which is a part of Ranthambhore Tiger Reserve.

The proposal was considered in the 70th meeting held on 13th October, 2022 wherein the Standing Committee decided to defer the proposal till the submission of proposal for declaration of ESZ around Ranthambore Tiger Reserve. The Standing Committee also directed that a cumulative impact study be carried out by Wildlife Institute of India in order to determine areas where mining can be allowed around Ranthambore Tiger Reserve.

The State Government of Rajasthan submitted a proposal for declaration of ESZ around Ranthambore Tiger Reserve. However, as the proposal lacked clarity, essential information has been sought from the State Government. The report from the Wildlife Institute of India is awaited.

Director, Wildlife Institute of India, Dehradun informed that the area has tiger movement and suggested that a holistic plan be prepared for mining in this

area. He said that the cumulative impact study report will be submitted by WII before the next meeting of the Standing Committee.

Decision taken: After discussions, the Standing Committee decided to defer the proposal till the next meeting.

71.2.11 Proposed Richhoti silica sand and masonry stone mine M.L.No.06/1982 M/s Kumar Herbals & Silica, Rajasthan.

FP/RJ/MIN/5863/2021

The Standing Committee was informed that the proposal is for use of 23.1726 ha Richhoti silica sand and masonry stone mine M.L.No.06/1982 M/s Kumar Herbals & Silica, Rajasthan. Proposed site is 8.2 Km away from the Kaila Devi Wildlife Sanctuary which is part of Ranthambhore Tiger Reserve (RTR).

The proposal was considered in the 70th meeting held on 13th October, 2022 wherein the Standing Committee decided to defer the proposal till the submission of proposal for declaration ESZ around Ranthambore Tiger Reserve. The Standing Committee also directed that a cumulative impact study be carried out by Wildlife Institute of India in order to determine areas where mining can be allowed around Ranthambore Tiger Reserve.
The State Government of Rajasthan submitted a proposal for declaration of ESZ around Ranthambore Tiger Reserve. However, as the proposal lacked clarity, essential information has been sought from the State Government. The report from the Wildlife Institute of India is awaited.

Director, Wildlife Institute of India, Dehradun informed that the area has tiger movement and suggested that a holistic plan be prepared for mining in this area. He said that the cumulative impact study report will be submitted by WII before the next meeting of the Standing Committee.

Decision taken: After discussions, the Standing Committee decided to defer the proposal till the next meeting.

71.2.12 Proposal for use of 1.25 ha of forest land for widening and upgradation of the existing road from Allapalli to Mailaram in Bhadradri Kothagudem District, Telangana.

FP/TG/ROAD/5487/2020

The Standing Committee was informed that the proposal is for use of 1.25 ha of forest land for widening and upgradation of the existing road from Allapalli to Mailaram in Bhadradri Kothagudem District, Telangana.

The proposal was first considered in the 69th meeting of the Standing Committee held on 29th July, 2022 wherein it was decided that the Inspector General of Forests (IGF), Integrated Regional Office, Hyderabad shall inspect the project site and submit report regarding the violations.

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

WII-EIA/CIA Study around Ranthambhore TR_149 **30 January 2023**

To,

Principal Secretary, Forest Department,
Van Bhawan, Vaniki Marg,
Jaipur 302 005, Rajasthan
Email: env_raj@yahoo.co.in

Sub: SC-NBWL directed Cumulative Impact Study to determine areas where mining can be allowed around Ranthambhore Tiger Reserve – reg.

Ref.: 1. MoEF&CC (WL Division) letter *F.No.6-175/2022 WL* dated 03.11.2022
2. Dean, WII letter *WII-EIA/CIA Study around Ranthambhore TR_149* dated 16.11.2022
3. PCCF (WL) & CWLW, Govt. of Rajasthan letter no. *F4(787)WLC/CWLW/2022/2075* dated 16.12.2022

Sir/Madam,

Following a decision taken during the 70th meeting of the Standing Committee of the National Board for Wild Life (SC-NBWL) held on 13th October 2022, the Union MoEF&CC vide reference 1 had requested the Wildlife Institute of India (WII) to conduct a Cumulative Impact Study to determine areas where mining can be allowed around Ranthambhore Tiger Reserve (RTR) within a period of one month. The Ministry had also requested the Principal Secretary, Rajasthan Forest Department to provide all necessary assistance to the WII for carrying out this study.

Due to the short time duration yet comprehensive nature of the proposed study, WII's approach has been to collate all available relevant data with the Rajasthan Forest Department and from other sources and published research reports supplemented by findings from a planned rapid field visit to the landscape. Accordingly, a data request letter was sent to your office (ref. 2) by the Dean, WII. We received a response from the office of the PCCF (WL) & CWLW, Govt. of Rajasthan (ref. 3) informing that the requested data, being exhaustive in nature, will be shared with the WII team at the time of the planned field visit.

Accordingly, a field visit by a WII team of up to three (03) persons has been planned during February 04-11, 2023 to explore areas in and around RTR, including the proposed mining sites. You are also requested to assign a nodal officer to facilitate the field visit, including all necessary logistical and accommodation support, as required. The nodal officer may also share all data with the team in the desired formats (both as hard and soft copies) as requested (including in the geographical/spatial domain) vide reference 2.

We also request for the following financial resources through your office for the field visit.

Travel to field site from Dehradun and back via flight/rail (03 persons) – INR 1,00,000/-
Local travel & Accommodation (08 days/nights) – INR 1,00,000/-
Contingency & Miscellaneous – INR 25,000/-
Professional faculty charges @ INR 5,000/day (08 days) – INR 40,000/-
Institutional charges @ 15% of total cost – INR 39,750/-

पत्रपेटी सं0 18, चन्द्रबनी, देहरादून – 248 001, उत्तराखण्ड, भारत
Post Box No. 18, Chandrabani, Dehradun - 248 001, Uttarakhand, INDIA
ई.पी.ए.बी.एक्स. :+91–135–2640114, 2640115, 2646100 फैक्स : 0135–2640117
EPABX : +91-135-2640114, 2640115, 2646100 Fax: 0135-2640117
ई–मेल / E-mail : wii@wii.gov.in वेब / Website: www.wii.gov.in

Hence, a total of **INR Three lakh four thousand seven hundred fifty rupees (3,04,750/-) only** is kindly sought from the Rajasthan Forest Department. The final study report will be made available within a reasonable timeframe from the date of receipt of all requested data and funds by the Rajasthan Forest Department.

Yours faithfully,

30/01/2023

(Virendra Tiwari, IFS)
Director

Copy for information and necessary action to:

1. Principal Chief Conservator of Forest (Wildlife) & Chief Wild Life Warden, Govt. of Rajasthan, Aranya Bhawan, Jhalana Institutional Area, Jaipur 302004. Email: pccf.cwlw.forest@rajasthan.gov.in
2. ADG (Wildlife) & Member-Secretary, SC-NBWL, Ministry of Environment, Forest & Climate Change, Indira Paryawaran Bhavan, Aliganj, Jor Bagh Road, New Delhi 110003. Email: adgwl-mef@nic.in
3. Dr. Sudheer Chintalapati, Scientist 'E', Ministry of Environment, Forest & Climate Change (WL Division), 2nd floor, Prithvi Wing, Indira Paryawaran Bhavan, Aliganj, Jor Bagh Road, New Delhi 110003. Email: sudheer.ch@gov.in
4. Dr. G. V. Gopi, Scientist-F & Nodal Officer, EIA Cell, Wildlife Institute of India, Dehradun. Email: gopigv@wii.gov.in, gopigv@gmail.com, eia@wii.gov.in

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

WII-EIA/CIA Study around Ranthambhore TR_149

31 January 2023

To,

Principal Chief Conservator of Forest (Wildlife) & Chief Wild Life Warden
Aranya Bhawan, Jhalana Institutional Area,
Jaipur 302 004, Rajasthan
Email: pccf.cwlw.forest@rajasthan.gov.in

Sub: **SC-NBWL directed Cumulative Impact Study to determine areas where mining can be allowed around Ranthambhore Tiger Reserve – reg.**

Ref.:
1. **Dean, WII letter *WII-EIA/CIA Study around Ranthambhore TR_149* dated 16.11.2022**
2. **Director, WII letter *WII-EIA/CIA Study around Ranthambhore TR_149* dated 30.01.2023**

Sir,

With respect to the aforementioned subject, I had written to the Principal Secretary, Forest Department, Govt. of Rajasthan, with a financial proposal to facilitate a rapid field visit in and around Ranthambhore Tiger Reserve (RTR). Through the same letter, a tentative field visit schedule by a WII team in the first week of February 2023 was also communicated.

Through this letter, I wish to inform your Office of further details of the planned field visit. A team of two (02) members from WII will visit the proposed mining and the cumulative impact assessment study area in and around RTR, as well as meet and interact with various stakeholders. The contact details of the team are as follows.

1. **Dr. G.V. Gopi, Scientist-F & Nodal Officer, EIA Cell, WII (mobile: 9412053644, email: gopigv@wii.gov.in)**
2. **Mr. Rohit R.S. Jha, Senior Project Associate, WII (mobile: 7977141480, email: rohitjha@wii.gov.in)**

The team is scheduled to arrive into Jaipur via Indigo Flight no. 6E 7275 on Sunday, February 05, 2023 at 20:10 hours and stay for the night in Jaipur. Our team would like to meet you on Monday, February 06, at your convenient time for an interaction to brief about the planned study, our approach and methodology, and expected outcomes.

Following this, the team plan to depart for Sawai Madhopur on the same day to interact with the CCF & Field Director, Ranthambhore Tiger Reserve. Subsequently, with your kind permission, they shall visit important wildlife habitats within the study area – 10 km-radius landscape around RTR – in the districts of Karauli, Kota, Bundi, Tonk and Sawai Madhopur, as well as in and around the Protected Areas within/constituting Ranthambhore and Ramgarh Vishdhari Tiger Reserves and the National Chambal Sanctuary during February 05-15 (duration may be flexible, depending on the scope of the work).

It is requested that a nodal officer be kindly appointed to facilitate the site inspection visit, including logistics and accommodation for the WII team. Since the team may require to visit areas in five districts under different Forest Divisional jurisdictions in the landscape, we request that a four-wheeler vehicle be kindly provided to the team during the entire duration of the visit, and accommodation at nearest Forest Rest Houses be kindly arranged for.

पत्रपेटी सं० 18, चन्द्रबनी, देहरादून – 248 001, उत्तराखण्ड, भारत
Post Box No. 18, Chandrabani, Dehradun - 248 001, Uttarakhand, INDIA
ई.पी.ए.बी.एक्स : +91-135-2640114, 2640115, 2646100 फैक्स : 0135-2640117
EPABX : +91-135-2640114, 2640115, 2646100 Fax : 0135-2640117
ई-मेल/E-mail : wii@wii.gov.in वेब/Website : www.wii.gov.in

I also request that all necessary and relevant data in the required formats as both hard and soft copies, as requested vide reference 1, may please be provided to the field team to help draft the final study report and submit it to SC-NBWL within the given timeframe.

Yours faithfully,

(Virendra Tiwari)
Director

31/01/2023

Copy for information to:

1. Principal Secretary, Forest Department, Van Bhawan, Vaniki Marg, Jaipur 302 005. Email: env_raj@yahoo.co.in
2. Principal Chief Conservator of Forest (Head of Forest Force), Aranya Bhawan, Jhalana Institutional Area, Jaipur 302 004. Email: pccf.raj.forest@rajasthan.gov.in
3. Chief Conservator Of Forests, Wildlife & Field Director, Ranthambhore Tiger Reserve, Near Govt. P.G. College, Sawai Madhopur 322 001.
4. Nodal Officer, EIA Cell, Wildlife Institute of India, Dehradun. Email: nodal.eia@wii.gov.in

F.No.6-175/2022 WL
Government of India
Ministry of Environment, Forest and Climate Change
(Wildlife Division)

2nd Floor, Prithvi Wing,
Indira Paryavaran Bhawan,
Jor Bagh Road, New Delhi 110003.

Date: 03rd November, 2022

To,

Director,
Wildlife Institute of India,
Chandrabani, Dehradun-248001.

Sub 1: Proposed Silica Sand mining project ML.No.09/2003 (Area 4.2682 Ha) in village- Manoharpura, Tehsil, district-Karauli of M/s Rama Minerals. - FP/RJ/MIN/4863/2020.

Sub 2: Proposed Richhoti silica sand and masonry stone mine M.L.No.06/1982 M/s Kumar Herbals & Silica, Rajasthan. Proposed site is 8.2 Km away from the Kaila Devi Wildlife Sanctuary which is part of Ranthambhore Tiger Reserve (RTR)-FP/RJ/MIN/5863/2021.

Sir,

Reference is invited to the subject mentioned above. The above proposals were discussed in the 70th Meeting of Standing Committee of National Board for Wild Life held on 13th October, 2022 under the Chairmanship of Hon'ble Minister for Environment, Forest & Climate Change.

2. After discussions, the Standing Committee decided that a cumulative impact study be carried out by Wildlife Institute of India in order to determine areas where mining can be allowed around Ranthambore Tiger Reserve.

3. The undersigned is therefore directed to request for carrying out the study as mentioned in the para '2' above and submission of report on or before 15th December, 2022.

09/12/23

Yours faithfully,

(Dr. Sudheer Chintalapati)
Scientist 'E'
Email: sudheer.ch@gov.in

महोदय,
उपरोक्त विषयांतर्गत संबंधित चिट्ठीयां आपके संदर्भ एवं उचित कार्यवाई के लिए संलग्न है। क्यूंकि यह जरूरी कार्य National Board For Wild Life द्वारा समयबद्ध है, आपसे विनती है कि अनुरोधित जानकारी/data [please refer WII letter dated 16 November 2022] उचित format में कृपया email द्वारा भेजने का कष्ट करें। National Chambal Sanctuary के संबंध में सर्व उपलब्ध जानकारी/data eia@wii.gov.in एवं rohitjha@wii.gov.in पर कृपया send करने का शीघ्र कष्ट करें।

भवदीय, रोहित झा (Senior Researcher, WII, Dehradun)
Mob. 7977141480

F.No.6-175/2022 WL
Government of India
Ministry of Environment, Forest and Climate Change
(Wildlife Division)

2nd Floor, Prithvi Wing,
Indira Paryavaran Bhawan,
Jor Bagh Road, New Delhi 110003.

Date: 03rd November, 2022

To,

Director,
Wildlife Institute of India,
Chandrabani, Dehradun-248001.

Sub 1: Proposed Silica Sand mining project ML.No.09/2003 (Area 4.2682 Ha) in village- Manoharpura, Tehsil, district-Karauli of M/s Rama Minerals, - FP/RJ/MIN/4863/2020.

Sub 2: Proposed Richhoti silica sand and masonry stone mine M.L.No.06/1982 M/s Kumar Herbals & Silica, Rajasthan. Proposed site is 8.2 Km away from the Kaila Devi Wildlife Sanctuary which is part of Ranthambhore Tiger Reserve (RTR)-FP/RJ/MIN/5863/2021.

Sir,

Reference is invited to the subject mentioned above. The above proposals were discussed in the 70th Meeting of Standing Committee of National Board for Wild Life held on 13th October, 2022 under the Chairmanship of Hon'ble Minister for Environment, Forest & Climate Change.

2. After discussions, the Standing Committee decided that a cumulative impact study be carried out by Wildlife Institute of India in order to determine areas where mining can be allowed around Ranthambore Tiger Reserve.

3. The undersigned is therefore directed to request for carrying out the study as mentioned in the para '2' above and submission of report on or before 15th December, 2022.

Yours faithfully,

(Dr. Sudheer Chintalapati)
Scientist 'E'
Email: sudheer.ch@gov.in

F.No.6-175/2022 WL
Government of India
Ministry of Environment, Forest and Climate Change
(Wildlife Division)

2nd Floor, Prithvi Wing,
Indira Paryavaran Bhawan,
Jor Bagh Road, New Delhi 110003.

Date: 03rd November, 2022

To,

Director,
Wildlife Institute of India,
Chandrabani, Dehradun-248001.

Sub 1: Proposed Silica Sand mining project ML.No.09/2003 (Area 4.2682 Ha) in village- Manoharpura, Tehsil, district-Karauli of M/s Rama Minerals. FP/RJ/MIN/4863/2020.

Sub 2: Proposed Richhoti silica sand and masonry stone mine M.L.No.06/1982 M/s Kumar Herbals & Silica, Rajasthan. Proposed site is 8.2 Km away from the Kaila Devi Wildlife Sanctuary which is part of Ranthambhore Tiger Reserve (RTR)-FP/RJ/MIN/5863/2021.

Sir,

Reference is invited to the subject mentioned above. The above proposals were discussed in the 70th Meeting of Standing Committee of National Board for Wild Life held on 13th October, 2022 under the Chairmanship of Hon'ble Minister for Environment, Forest & Climate Change.

2. After discussions, the Standing Committee decided that a cumulative impact study be carried out by Wildlife Institute of India in order to determine areas where mining can be allowed around Ranthambore Tiger Reserve.

3. The undersigned is therefore directed to request for carrying out the study as mentioned in the para '2' above and submission of report on or before 15th December, 2022.

9/10/2/23

कार्यालय उप वन संरक्षक कोटा (राज.)

Yours faithfully,

(Dr. Sudheer Chintalapati)
Scientist 'E'
Email: sudheer.ch@gov.in

To,
DFO (T) Bundi, Rajasthan Forest Dept
10 February 2023

Page 1 of 2

Subject: Data request & data facilitation by your Office regarding NBWL task/study

Sir,

Wildlife Institute of India (WII), Dehradun has been tasked to undertake a cumulative impact assessment study of a 10 km-radius landscape around Ranthambhore Tiger Reserve to identify areas for wildlife conservation and mining. In this regard, we request that data regarding wildlife aspects mentioned in our letter dated 16 Nov 2022 (SN 1-9) be kindly provided. We also request that data related to mining aspects be kindly facilitated to the respective Department. Thank you.

Sincerely,

mob 9833490579

F.No.6-175/2022 WL
Government of India
Ministry of Environment, Forest and Climate Change
(Wildlife Division)

2nd Floor, Prithvi Wing,
Indira Paryavaran Bhawan,
Jor Bagh Road, New Delhi 110003.

Date: 03rd November, 2022

To,

Director,
Wildlife Institute of India,
Chandrabani, Dehradun-248001.

Sub 1: Proposed Silica Sand mining project ML.No.09/2003 (Area 4.2682 Ha) in village- Manoharpura, Tehsil, district-Karauli of M/s Rama Minerals. - FP/RJ/MIN/4863/2020.

Sub 2: Proposed Richhoti silica sand and masonry stone mine M.L.No.06/1982 M/s Kumar Herbals & Silica, Rajasthan. Proposed site is 8.2 Km away from the Kaila Devi Wildlife Sanctuary which is part of Ranthambhore Tiger Reserve (RTR)-FP/RJ/MIN/5863/2021.

Sir,

Reference is invited to the subject mentioned above. The above proposals were discussed in the 70th Meeting of Standing Committee of National Board for Wild Life held on 13th October, 2022 under the Chairmanship of Hon'ble Minister for Environment, Forest & Climate Change.

2. After discussions, the Standing Committee decided that a cumulative impact study be carried out by Wildlife Institute of India in order to determine areas where mining can be allowed around Ranthambore Tiger Reserve.

3. The undersigned is therefore directed to request for carrying out the study as mentioned in the para '2' above and submission of report on or before 15th December, 2022.

Yours faithfully,

(Dr. Sudheer Chintalapati)
Scientist 'E'
Email: sudheer.ch@gov.in

10/2/2023

APPENDIX 8: WII Research Team's Data request (wildlife-related) & Data facilitation (mining-related) letters to various RJFD field offices within Cumulative Impact Study Area

F.No.6-175/2022 WL
Government of India
Ministry of Environment, Forest and Climate Change
(Wildlife Division)

2nd Floor, Prithivi Wing,
Indira Paryavaran Bhawan,
Jor Bagh Road, New Delhi 110003.

Date: 03rd November, 2022

To,

Director,
Wildlife Institute of India,
Chandrabani, Dehradun-248001.

Sub 1: Proposed Silica Sand mining project ML.No.09/2003 (Area 4.2682 Ha) in village- Manoharpura, Tehsil, district-Karauli of M/s Rama Minerals.- FP/RJ/MIN/4863/2020

प्राप्त किया

Sub 2: Proposed Richhoti silica sand and masonry stone mine M.L.No.06/1982 M/s Kumar Herbals & Silica, Rajasthan. Proposed site is 8.2 Km away from the Kaila Devi Wildlife Sanctuary which is part of Ranthambhore Tiger Reserve (RTR)-FP/RJ/MIN/5863/2021.

(B)
10/2/23

Sir,

कार्यालय उप वन संरक्षक वन्य जीव, कोटा

Reference is invited to the subject mentioned above. The above proposals were discussed in the 70th Meeting of Standing Committee of National Board for Wild Life held on 13th October, 2022 under the Chairmanship of Hon'ble Minister for Environment, Forest & Climate Change.

2. After discussions, the Standing Committee decided that a cumulative impact study be carried out by Wildlife Institute of India in order to determine areas where mining can be allowed around Ranthambore Tiger Reserve.

3. The undersigned is therefore directed to request for carrying out the study as mentioned in the para '2' above and submission of report on or before 15th December, 2022.

Yours faithfully,

(Dr. Sudheer Chintalapati)
Scientist 'E'
Email: sudheer.ch@gov.in

To,
CCF(WL) Kota & FD, MTR,
Forest Dept., Govt of Rajasthan
10 February 2023

DCF, WL, Kota
For necessary action as per direction of CWLW
R.No. 2075 dt. 16.12.22.

Subject: Request for data critical to executing an SC-NBWL task, -reg.

Page 1 of 2

(एस. पी. सिंह)
क्षेत्र निदेशक, मुकन्दरा हिल्स टाईगर रिजर्व, कोटा एवं
क्षेत्र निदेशक, रामगढ़ विषधारी टाईगर रिजर्व, कोटा

Sir,
With respect to delineating critical wildlife zones around a 10 km-radius landscape as per a task assigned by the SC-NBWL through the Union MoEF&CC, certain data required for this purpose under SN 1-10 in our letter dated Nov 16, 2022 addressed to the Prin. Sec., Forest Dept., Govt of Raj. As this is an urgent SC-NBWL task, your kind cooperation is sought.

Sincerely,
Rohit Jha, Senior Researcher, WII

नेशनल पार्क , गेम सेन्चूरी व अभयारण्य के 10 किलोमीटर की परिधी में आने वाले खनन पट्टो की सूची दिनांक 31.05.22

क्र. सं.	खनन पट्टो /क्वारी लाइसेंस नं0	नाम पट्टाधारी	खनिज	क्षेत्र हेक्टर में	ग्राम तहसील व जिला	10 किलोमीटर की परिधी में पडने वाला क्षेत्र हेक्टर में	नेशनल पार्क गेम सेन्चुरी व अभ्यारण्य का नाम	नेशनल पार्क गेम सेन्चुरी से खनन पटटे/ क्वारी लाइसेंस की दूरी कि.मी.		
1	3/2000	इन्द्रा मित्तन	सिलिका सेण्ड	4.0883	रामठरा,सपोटरा,करौली	4.0883	कैलादेवी अभ्यारण्य	2.50	20000	बन्द
2	2/1990	श्रीराम माईन्स एण्ड मिनरल्स	सिलिका सेण्ड	4.90	रामठरा,सपोटरा,करौली	4.90	,,	2.50	19600	बन्द
3	4/1995	हरीचरण अग्रवाल	सिलिका सेण्ड	4.579	गोपालगढ आलमपुर करौली	4.579	,,	8.30	18316	चलू
4	4/1982	सिलिका कार्पोरेशन	सिलिका सेण्ड	4.68	आलमपुर करौली	4.68	,,	7.25	18720	चलू
5	17/2000	पुष्पेन्द्र कुमार अग्रवाल	सिलिका सेण्ड	4.61	रामापुरा करौली	4.61	,,	4.50	18428	बन्द
6	4/1994	रामापुरा मिनिरल्स	सिलिका सेण्ड	18.12	रामापुरा करौली	18.12	,,	4.50	72480	बन्द
7	21/1981	मेसर्स इन्ट्रीगेटेड ग्लास लि0	सिलिका सेण्ड	4.95	मनोहरपुरा करौली	4.95	,,	4.00	20000	बन्द
8	1/1992	दुर्गा प्रसाद अग्रवाल	सिलिका सेण्ड	4.676	घोरेरी करौली	4.676	,,	3.65	18720	चालू
9	12/1976	प्रकाश चन्द मुरारी लाल	सिलिका सेण्ड	15.541	घोरेरी करौली	15.541	,,	2.50	62164	बन्द
10	2/1994	जय भैरवधाम मिनरल्स	सिलिका सेण्ड	4.80	गैरई करौली	4.80	,,	7.00	19200	बन्द
11	3/1990	शुभम मिनिरिल्स	सिलिका सेण्ड	24.563	सेमरदा करौली	24.563	,,	7.50	12393	बन्द
12	6/1982	कुमार हर्बल्स	सिलिका सेण्ड	15.20	रीछोटी करौली	15.20	,,	8.50	140800	बन्द
13	12/1985	सगर मिनरल्स	सिलिका सेण्ड	4.2878	बररीया करौली	4.2878	,,	9.25	20000	बन्द
14	2/1992	दुर्गा प्रसाद अग्रवाल	सिलिका सेण्ड	4.26	मिजोरा सपोटरा	4.26	,,	4.00	17040	बन्द
15	11/2000	राजस्थान सेण्ड ऐण्ड क्ले	सिलिका सेण्ड	4.9725	मिजोरा सपोटरा	4.9725	,,	4.25	20000	बन्द
16	1/1984	अंजुल पाल जादौन	सिलिका सेण्ड	4.95	डोंगरी सपोटरा	4.95	,,	4.80	35590	बन्द
17	1/1973	मीठा लाल बोहरा	सिलिका सेण्ड	263.05	कोढई गोठरा सपोटरा	263.05	कैलादेवी अभ्यारण्य	8.25	0	बन्द
18	8/1979	गिर्राज घरन इन्टरप्राईजेज	सिलिका सेण्ड	38.8495	लोहर्रा करौली	38.8495	,,	2.50	0	बन्द

19	4/1976	मेसर्स जगदम्बा मिनिरल्स	सिलिका सेण्ड	23.7334	खिरखिडा करौली	23.7334	,,	8.60	94936	बन्द
20	5/1985	श्रीराम माईन्स एण्ड मिनरल्स	व्हाईट क्ले	4.99	क्वान्टिपुरा सपोटरा	4.99	,,	3.60	19960	बन्द
21	2/1999	मेसर्स गणेश मिनिरल्स	सिलिका सेण्ड	5.00	खिरखिडा करौली	5.00	,,	8.50	20000	बन्द
22	3/1999	रामापुरा मिनरल्स	सिलिका सेण्ड	5.00	खिरखिडा करौली	5.00	,,	8.50	20000	बन्द
23	9/2003	रामा मिनरल्स	सिलिका सेण्ड	5.00	मोहनपुरा करौली	5.00	,,	5.50	20000	बन्द
24	5/2001	जगन राम मीना	सिलिका सेण्ड	4.36	बिचपुरिया करौली	4.36	,,	5.60	17424	बन्द
25	14/2006	मेसर्स इन्ट्रीगेटेड ग्लास लि0	सिलिका सेण्ड	12.909	खिरखिडा करौली	12.909	,,	9.85	51636	बन्द
26	24/2008	शिवम मिनरल्स	चाईना क्ले, व्हाईट क्ले	4.875	खावदा सपोटरा	4.875	,,	5.00	19500	चालू
27	16/2010	मेसर्स अनफाल मिनरल्स	सिलिका सेण्ड	4.06	खावदा सपोटरा	4.06	,,	4.50	24865	चालू
28	3/2008	मोहम्मद रफीक	सिलिका सेण्ड	4.40	मनोहरपुरा करौली	4.40	,,	6.90	17600	बन्द
29	4/2008	महालक्ष्मी मिनरल्स	सिलिका सेण्ड	4.40	मनोहरपुरा करौली	4.40	,,	6.90	17600	बन्द
30	26/2008	कुमार इन्फ्राक्स्टर्च	सिलिका सेण्ड	4.75	मनोहरपुरा करौली	4.75	,,	6.80	19452	बन्द
31	1/2011	अनिल कुमार गोयल	सिलिका सेण्ड	4.02	मनोहरपुरा करौली	4.02	,,	4.90	16200	बन्द
33	55/2006	जानकी देवी	स.खडिया	1.11	बापौती सपोटरा	1.11	,,	6.00	25520	बन्द
34	10/2002	कप्तान सिंह मीना	मेसेनरी स्टोन	1.00	मनोहरपुरा करौली	1.00	,,	4.75	19600	बन्द
35	18/2002	पुष्पादेवी	मेसेनरी स्टोन	1.00	मनोहरपुरा करौली	1.00	,,	4.75	19600	बन्द
36	8/2002	पुष्पादेवी	मेसेनरी स्टोन	1.00	मनोहरपुरा करौली	1.00	,,	4.75	19600	बन्द
37	6/2002	सुनील कुमार गर्ग	मेसेनरी स्टोन	1.00	मनोहरपुरा करौली	1.00	कैलादेवी अभ्यारण्य	4.75	19600	बन्द
38	3/2000	सुनील कुमार गर्ग	मेसेनरी स्टोन	1.00	मनोहरपुरा करौली	1.00	,,	4.75	19600	बन्द
39	74/2004	स्तीश गर्ग	मेसेनरी स्टोन	1.00	मनोहरपुरा करौली	1.00	,,	4.75	30000	बन्द
40	12/2000	विष्णु चंद मित्तल	सेण्ड स्टोन	3.40	खोहरी करौली	3.40	,,	3.85	274674	बन्द

41	69/2002	नवल सिंह	सेण्ड स्टोन	1.114	अतेवा करौली	1.114	,,	5.00	77980	बन्द
42	35/2002	भगवती लाल जाटव	सेण्ड स्टोन	1.13	अतेवा करौली	1.13	,,	5.00	79100	चालू
43	138/2001	पंकज कुमार मित्तल	सेण्ड स्टोन	1.044	अतेवा करौली	1.044	,,	5.60	81900	चालू
44	58/2001	मनोज कुमार मित्तल	सेण्ड स्टोन	2.1101	अतेवा करौली	2.1101	,,	5.40	149100	चालू
45	20/2007	फकीरा मीना	सेण्ड स्टोन	3.0485	राजौर करौली	3.0485	,,	9.25	0	बन्द
46	70/1998	रूपराम मीना	सेण्ड स्टोन	2.50	करसाई करौली	2.50	,,	9.85	0	बन्द
47	164/2001	हरीओम शर्मा	सेण्ड स्टोन	1.00	करसाई करौली	1.00	,,	9.75	70000	बन्द
48	105/2004	जयलाल माली	सेण्ड स्टोन	1.96	करसाई करौली	1.96	,,	9.75	137200	बन्द
49	39/2000	बिशनलाल मीना	सेण्ड स्टोन	4.864	डुंडापुरा करौली	4.864	,,	9.65	203880	बन्द
50	163/2001	शरद भारद्वाज	सेण्ड स्टोन	1.36	डुंडापुरा करौली	1.36	,,	8.20	0	बन्द
51	1/2004	श्रीमती रामश्री बेवा	सेण्ड स्टोन	1.142	डुंडापुरा करौली	1.142	कैलादेवी अभ्यारण्य	8.40	79940	बन्द
52	4/1993	रंगीलाल मीना	सेण्ड स्टोन	999.90	ग्रुप न. 2	221.50	,,	5.14	0	बन्द
53	19/1980	तिवाडी झुमर लाल स्वरूप लाल	सेण्ड स्टोन	162.230	महु करसाई करौली	46.3574	,,	9.50	522392	बन्द
54	26/1992	प्रकाश चन्द गुप्ता	सेण्ड स्टोन	2.2728	मांडीभाट सपोटरा	2.2728	,,	1.90	49838	बन्द
55	27/1992	प्रकाश चन्द गुप्ता	सेण्ड स्टोन	4.9422	मांडीभाट सपोटरा	4.9422	,,	2.00	59668	बन्द
56	2/1981	भौरी लाल जैन	सेण्ड स्टोन	63.62	चौबे की ग्वारी	63.62	,,	3.00	0	बन्द
57	9/2006	पंचम स्टोन	सेण्ड स्टोन	1.60	चौबे की ग्वारी	1.60	,,	2.50	0	बन्द
58	26/2008	रामरज गुर्जर	सेण्ड स्टोन	1.93	रायबेली सपोटरा	1.93	,,	2.00	135100	चालू
59	16/1989	धर्मेन्द्र कुमार शर्मा	सेण्ड स्टोन	8.90	बहादुर पुर	8.90	,,	6.25	38598	चालू
60	25/1989	ममतेश भारद्वाज	सेण्ड स्टोन	238.30	बहादुर पुर	238.30	,,	1.25	722398	बन्द
61	8N/1987	योगेश कुमार	सेण्ड स्टोन	1.80	बहादुर पुर	1.80	,,	6.50	0	बन्द

62	13/2001	राजेन्द्र भारद्वाज	सेण्ड स्टोन	4.389	बहादुर पुर	4.389	,,	7.35	0	बन्द
63	332/1981	शशि भारद्वाज	सेण्ड स्टोन	1.00	बहादुर पुर	1.00	,,	5.25	0	बन्द
64	36/2001	श्रीमती ममतेश भारद्वाज	सेण्ड स्टोन	1.49	बहादुर पुर	1.49	कैलादेवी अभ्यारण्य	5.25	0	बन्द
65	213/2001	विष्णु चंद शर्मा	सेण्ड स्टोन	1.17	बहादुर पुर	1.17	,,	6.25	0	बन्द
66	80/2002	मुंशीलाल मीना	सेण्ड स्टोन	1.27	भांकरी मंडरायल	0.75	,,	9.95	88900	बन्द
67	62/2001	नारायण लाल मीना	सेण्ड स्टोन	1.57	भांकरी मंडरायल	1.57	,,	9.85	109900	चालू
68	182/2001	रामलखन मीणा	सेण्ड स्टोन	1.8503	भांकरी मंडरायल	1.8503	,,	9.80	129521	बन्द
69	33/1992	रामनिवास माली	सेण्ड स्टोन	4.5917	बहरदा मंडरायल	4.5917	,,	7.80	95678	चालू
70	68/2001	राजरज माली	सेण्ड स्टोन	1.3588	बहरदा मंडरायल	1.3588	,,	7.85	93800	बन्द
71	155/2001	शिवचरण माली	सेण्डस्टोन	0.98	बुगडार मंडरायल	0.98	,,	6.00	70000	बन्द
72	157/2001	रमेश मीना	सेण्ड स्टोन	1.10	बुग्डार मंडरायल	1.10	,,	7.50	77000	बन्द
73	158/2001	सुरग्यानी मीणा	सेण्ड स्टोन	1.07	बुग्डार मंडरायल	1.07	,,	7.25	74900	बन्द
74	109/2001	देवकीनन्दन शर्मा	सेण्ड स्टोन	1.23	बुग्डार मंडरायल	1.23	,,	7.25	0	बन्द
75	10/2003	बलवीर प्रसाद शर्मा	सेण्ड स्टोन	1.716	बाटदा मंडरायल	1.716	,,	7.25	0	बन्द
76	28/1982	राजेन्द्र भारद्वाज	सेण्ड स्टोन	10.00	बाटदा मंडरायल	10.00	,,	6.85	0	बन्द
77	75/2001	श्रीमती रूकमणी	सेण्ड स्टोन	1.1694	बाटदा मंडरायल	1.1694	,,	7.25	0	बन्द
78	6/1995	नारायण सिंह	सेण्ड स्टोन	8.25	बाटदा मंडरायल	8.25	,,	7.25	190794	बन्द
79	7/1995	श्रीमती मंजुलता	सेण्ड स्टोन	8.05	बाटदा मंडरायल	8.05	,,	7.25	195768	चालू
80	15/2003	जगदीश प्रसाद शर्मा	सेण्ड स्टोन	0.993	बाटदा मंडरायल	0.993	,,	8.00	70014	चालू
81	10/2006	ब्रह्मानन्द शर्मा	सेण्ड स्टोन	1.0109	बाटदा मंडरायल	1.0109	,,	8.50	70000	चालू
82	45/2002	रामकुमार	सेण्ड स्टोन	1.00	बाटदा मंडरायल	1.00	,,	8.00	70000	बन्द
83	228/2001	गीतादेवी शर्मा	सेण्ड स्टोन	1.443	मक्कनपुर मंडरायल	1.443	कैलादेवी अभ्यारण्य	7.00	0	चालू

84	1/1998	नारायण सिंह	सेण्ड स्टोन	2.19	मक्कनपुर मंडरायल	2.19	,,	7.45	296462	बन्द
85	28/2000	कुमेर मीना	सेण्ड स्टोन	1.1589	मक्कनपुर मंडरायल	1.1589	,,	7.80	84000	चालू
86	54/1998	सीताराम माली	सेण्ड स्टोन	2.5101	मक्कनपुर मंडरायल	2.5101	,,	8.00	315560	चालू
87	55/1998	गिर्राज प्रसाद शर्मा	सेण्ड स्टोन	2.6752	मक्कनपुर मंडरायल	2.6752	,,	7.80	0	चालू
88	57/1998	रामजीलाल मीना	सेण्ड स्टोन	3.85	मक्कनपुर मंडरायल	3.85	,,	8.50	0	बन्द
89	30/1998	दिनेश चंद राजाराम	सेण्ड स्टोन	8.9855	मक्कनपुर बाटदा मंडरायल	8.9855	,,	7.50	0	बन्द
90	200/2001	नन्द कुमार शर्मा	सेण्ड स्टोन	1.5525	मक्कनपुर बाटदा मंडरायल	1.5525	,,	7.65	0	बन्द
91	59/2001	दिगम्बर दयाल चतुर्वेदी	सेण्ड स्टोन	3.1480	मक्कनपुर बाटदा मंडरायल	3.1480	,,	7.65	220360	बन्द
92	1(N)/1999	दीपक शर्मा	सेण्ड स्टोन	4.00	मक्कनपुर बाटदा मंडरायल	4.00	,,	7.65	280000	बन्द
93	19/1985	अरविन्द तिवारी	सेण्ड स्टोन	40.3621	मक्कनपुर बाटदा मंडरायल	40.3621	,,	7.25	114954	बन्द
94	115/2004	चरण बाई	सेण्ड स्टोन	1.022	कंचनपुर मंडरायल	1.022	,,	8.50	71400	बन्द
95	20/1994	मै वत्सला मिनरल्स	सेण्ड स्टोन	10.00	गढी का गॉव	10.00	,,	8.50	562028	बन्द
96	6/1993	बुद्धो देवी	सेण्ड स्टोन	4.5539	गढी का गॉव	4.5539	,,	8.00	325080	चालू
97	7/1993	बुद्धो देवी	सेण्ड स्टोन	4.6225	गढी का गॉब	4.6225	,,	8.25	330960	बन्द
98	7/1990	मुलाराम मीना	सेण्ड स्टोन	4.677	गढी का गॉव	4.677	,,	8.00	76480	बन्द
99	16/2000	राजेन्द्र दयाल	सेण्ड स्टोन	161.3248	लांगरा मंडरायल	161.3248	,,	5.00	346156	बन्द
100	2/1996	मै0 कृष्ण कुमार दीपक कुमार	सेण्ड स्टोन	108.69	लांगरा मंडरायल	108.69	,,	6.00	24540	बन्द

नोट– 0 से 1 कि.मी. की परिधी में 0 खनन पट्टे एवं 1 से 10 कि.मी. की परिधी में कुल खनन पट्टे 100 में से 19 खनन पट्टे चालू एवं 81 खनन पट्टे बन्द हैं।

खनि अभियन्ता करौली

APPENDIX 9 : Mining Leases data obtained through various district offices of DMG, Govt. of Raj.

जरिये ईमेल

राजस्थान सरकार

कार्यालय खनि अभियन्ता,खण्ड द्वितीय, बून्दी(राज0)

खनिज भवन, सावित्रि बाई फुले कन्या छात्रावास के पास, बीबनवां रोड, बून्दी,
दूरभाष नंबर 0747–294234 /E-mail me.bundi2@rajasthan.gov.in

क्रमांक /ख.अ./बून्दी–/मा.चि./2022/ 331 दिनांक :– 10.02.2023

प्रेषिति :– श्रीमान उपवन संरक्षक,
बून्दी।

विषय :– आपके क्षेत्र अधीन स्वीकृत खनन पट्टों के सम्बन्ध में भारतीय वन्य जीव संस्थान देहरादून को वांछित डाटा उपलब्ध करवाने बाबत ।

प्रसंगः– आपका पत्रांक 1340-42 दिनांक 09.02.2023 के क्रम में ।

महोदय,

उपरोक्त विषयान्तर्गत निवेदन है कि आपका पत्रांक 1340-42 दिनांक 09.02.2023 के साथ जरिये ई-मेल प्राप्त KML सॉफ्ट फाइल के अनुसार रणथम्भोर टाइगर रिजर्व के 10 कि०मी० रेडियस में आने वाले स्वीकृत खनन पट्टों की सूचि निम्नलिखित है :–

S.No.	Name of the lessees	M.L No.	Village	Tehsil	Distt.	Area in Hectare	Mineral
1	Gopal Singh S/o Bhanwar Singh	389/1998	Pipaliya	Nainwa	Bundi	1	Masonary stone
2	Ravendara Chandana S/o Shankar lal	333/2002	KesarPura	Bundi	Bundi	1	Masonary stone
3	Ravendara Chandana S/o Shankar lal	369/2005	Khadibara	Bundi	Bundi	1	Masonary stone

भवदीय

(प्रकाश माली)
खनि अभियन्ता,
खण्ड द्वितीय, बूंदी

APPENDIX 9 : Mining Leases data obtained through various district offices of DMG, Govt. of Raj.

नेशनल नेशनल पार्क, गेम सेन्चूरी व अभ्यारण्य के 1 कि.मी. से 10 कि.मी. की परिधि में आने वाले खननपट्टों की सूची

क्र. सं.	कार्यालय का नाम	जिला	अभ्यारण्य का नाम	खनन पट्टाधारी का नाम	खननपट्टा संख्या	खनिज	क्षेत्र	क्षेत्रफल (है0)	अक्षांश एवं देशान्तर	अभ्यारण्य से दूरी(कि.मी.)
1	स.ख.अ. सवाई माधोपुर	सवाई माधोपुर	रणथम्भौर एन.पी.	श्री खलील अहमद	54/1985	मैसेनरी स्टोन	गलता मन्दिर	0.4257	76°23'19.87" 26°0'12.94"	अभ्यारण्य की सीमा पर आता है।
2	स.ख.अ. सवाई माधोपुर	सवाई माधोपुर	रणथम्भौर एन.पी.	श्री नफीस अहमद	1/1998	मैसेनरी स्टोन	हनुमान डूंगरी	0.65	76°23'33.86" 25°59'50.06"	800 मीटर
3	स.ख.अ. सवाई माधोपुर	सवाई माधोपुर	रणथम्भौर एन.पी. /नेशनल चम्बल सेन्चुरी	श्री रामशंकर शर्मा	87/2006	मैसेनरी स्टोन	श्योपुरा	1.00	76°20'11.91" 25°45'48.1"	500 मीटर लगभग/ 2 किलोमीटर लगभग
4	स.ख.अ. सवाई माधोपुर	सवाई माधोपुर	रणथम्भौर एन.पी. /नेशनल चम्बल सेन्चुरी	श्री सीताराम शर्मा	67/2004	मैसेनरी स्टोन	बालेर	1.00	76°46'29.96" 26°04'27.31	776 मीटर / 7 किलोमीटर लगभग
5	स.ख.अ. सवाई माधोपुर	सवाई माधोपुर	रणथम्भौर एन.पी. /नेशनल चम्बल सेन्चुरी	श्री प्रहलाद मथुरिया	68/2004	मैसेनरी स्टोन	बालेर	1.00	76°46'31.58" 26°04'25.16"	856 मीटर / 7 किलोमीटर लगभग
6	स.ख.अ. सवाई माधोपुर	सवाई माधोपुर	रणथम्भौर एन.पी. /नेशनल चम्बल सेन्चुरी	श्री भँवर सिंह	1/2007	मैसेनरी स्टोन	बालेर	1.00	76°46'29.96" 26°04'27.31"	850 मीटर लगभग/ 7 किलोमीटर लगभग
7	स.ख.अ. सवाई माधोपुर	सवाईम धोपुर	रणथम्भौर एन.पी.	श्रीमति सीमा गोयल	16/1997	मैसेनरी स्टोन	कोठी पाचोला स	1.00	76°16'47.17" 25°50'50.5	1800 मीटर लगभग
8	स.ख.अ. सवाई माधोपुर	सवाईम धोपुर	रणथम्भौर एन.पी.	श्री जोगेन्द्र सिंह	17/1997	मैसेनरी स्टोन	कोठी पाचोला स	1.00	76°16'44.78" 25°50'43.56	1800 मीटर लगभग
9	स.ख.अ. सवाई माधोपुर	सवाईम धोपुर	रणथम्भौर एन.पी.	श्री जोगेन्द्र सिंह	18/1997	मैसेनरी स्टोन	कोठी पाचोला स	1.00	76°16'42.89" 25°50'45.66"	2000 मीटर लगभग
10	स.ख.अ. सवाई माधोपुर	सवाईम धोपुर	रणथम्भौर एन.पी.	श्रीमति सीमा गोयल	19/1997	मैसेनरी स्टोन	कोठी पाचोला स	1.00	76°16'45.34" 25°50'46.89	2000 मीटर लगभग
11	स.ख.अ. सवाई माधोपुर	सवाईम धोपुर	रणथम्भौर एन.पी.	श्रीमति अनुपा बंसल	20/1997	मैसेनरी स्टोन	कोठी पाचोला स	1.00	76°16'41.19" 25°50'43.59"	2000 मीटर लगभग
12	स.ख.अ. सवाई माधोपुर	सवाईम धोपुर	रणथम्भौर एन.पी.	श्रीमति कुसुम लता सिंह	21/1997	मैसेनरी स्टोन	कोठी पाचोला स	1.00	76°16'47.67" 25°50'45.36"	1800 मीटर लगभग

उक्त सूची में अभ्यारण्य सीमा से खनन पटटो की दूरी कार्यालय में उपलब्ध वन विभाग से प्रमाणित जी.टी.शीट के आधार पर मार्क कर लगभग दुरी अंकित की गई है।

कार्यालय उप वन संरक्षक एवं उप क्षेत्रीय निदेशक (प्रथम) बाघ परियोजना रणथम्भौर, सवाई माधोपुर

क्रमांक: एफ ( ) एनओसी / उपसं (प्रथम) / 2021-22 / 1552 दिनांक : 7-/3/22

निमित,

खनि अभियन्ता
खान एवं भू-विज्ञान विभाग, कोटा।

विषय :- तहसील इन्द्रगढ़ जिला बून्दी में स्वीकृत खनन पट्टों की रणथम्भौर बाघ रिजर्व क्षेत्र से दूरी मिजवाने बाबत्।

सन्दर्भ :- आपका पत्र क्रमांक 107 दिनांक 01.11.2021 व 1031 दिनांक 16.12.2021 के क्रम में।

महोदय,

उपरोक्त विषयान्तर्गत सन्दर्भित पत्र द्वारा तहसील इन्द्रगढ़ जिला बून्दी में स्वीकृत कुल 31 खनन पट्टों की रणथम्भौर बाघ रिजर्व क्षेत्र से दूरी की जानकारी चाही गई है। जिसके सम्बन्ध में आपके द्वारा प्रासंगिक पत्र के संलग्न खनन पट्टा क्षेत्रों के जी.पी.एस. कॉर्डीनेट्स की सूची इस कार्यालय को प्रेषित की गई है। अतः प्रेषित जी.पी. एस. कॉर्डीनेट्स के अनुसार खनन पट्टा क्षेत्र की रणथम्भौर टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट (सी.टी.एच.) क्षेत्र से दूरी निम्नानुसार है :-

क्र.सं.	एम.एल. संख्या	आपके पत्र के संलग्न इस कार्यालय को प्रेषित आवेदित खनन क्षेत्र के जी.पी.एस. कॉर्डीनेट जिसमें से वन सीमा के निकटतम बिन्दु	आवेदित खनन क्षेत्र की रणथम्भौर टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट क्षेत्र (सी.टी.एच.) से दूरी (कि.मी. में)	रणथम्भौर टाईगर रिजर्व के क्रिटीकल टाईगर हैबीटाट क्षेत्र (सी.टी.एच.) की निकटतम वन सीमा का जी.पी.एस. कॉर्डीनेट
1	2	3	4	5
1	63/2000	N 25°44'10.32''E 76°12'18.75''	9.350	N 25°46'39.02'' E 76°17'13.27''
2	64/2000	N 25°44'09.78''E 76°12'15.21''	9.450	
3	69/2001	N 25°44'12.40''E 76°12'32.00''	9.00	
4	72/2001	N 25°44'15.29''E 76°12'25.53''	9.150	
5	64/2001	N 25°44'05.77''E 76°12'46.74''	8.790	
6	68/2001	N 25°44'09.58''E 76°12'42.52''	8.800	
7	47/99	N 25°44'02.47''E 76°12'46.40''	8.800	
8	62/2001	N 25°44'00.72''E 76°12'04.99''	9.850	
9	67/2001	N 25°44'14.15''E 76°12'28.89''	9.05	
10	70/2001	N 25°44'11.87''E 76°12'35.61''	8.950	
11	152/98	N 25°44'08.83''E 76°12'34.35''	9.00	
12	76/96	N 25°44'06.39''E 76°12'41.92''	8.900	
13	65/2000	N 25°44'07.08''E 76°12'37.46''	8.960	
14	65/2001	N 25°44'13.52''E 76°12'18.16''	9.350	
15	61/2001	N 25°44'02.67''E 76°12'07.86''	9.760	
16	30/96	N 25°44'08.61''E 76°12'11.79''	9.570	
17	71/2001	N 25°44'10.12''E 76°12'38.72''	8.900	
18	62/96	N 25°44'12.25''E 76°12'24.27''	9.210	
19	63/96	N 25°44'11.11''E 76°12'27.63''	9.160	
20	10/97	N 25°44'09.36''E 76°12'30.74''	9.100	
21	100/06	N 25°44'06.58''E 76°12'15.80''	9.500	
22	16/04	N 25°44'01.11''E 76°12'48.95''	8.800	
23	17/2005	N 25°44'02.35''E 76°12'10.37''	9.700	
24	23/2003	N 25°44'08.27''E 76°11'07.38''	11.200	

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25	24 / 2003	N 25°44'10.38"E 76°11'04.65"	11.250	
26	22 / 96	N 25°40'34.08"E 76°13'08.89"	11.360	N 25°44'00.82" E 76°18'46.81"
27	93 / 01	N 25°40'44.68"E 76°13'29.70"	10.700	
28	7 / 2001	N 25°40'38.71"E 76°13'20.58"	11.00	
29	12 / 2004	इस कार्यालय के पत्र क्रमांक 8637 दिनांक 19.08.2021 से पूर्व में भिजवा दी गई है।		
30	29 / 91	N 25°40'07.02"E 76°14'29.29"	10.150	N 25°44'00.82" E 76°18'46.81"

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22-3-22

1. उक्तानुसार आवेदित खनन पट्टा क्षेत्रों में से क्र. सं. 1 से 23 तक अंकित एम.एल. नम्बर रणथम्भौर टाईगर रिजर्व के क्रिटिकल टाईगर हैबिटाट (सी.टी.एच) क्षेत्र की निकटतम वन सीमा से 10 कि.मी. की परिधि में स्थित है। इसलिए भारत सरकार, वन पर्यावरण एवं जलवायु परिवर्तन मंत्रालय (वन्य जीव संभाग) के पत्र एफ.एन.6–60 / 2020 वाईल्ड लाईफ पार्ट (1) दिनांक 16.07.2020 (प्रति संलग्न) के बिन्दु संख्या 3 (ii) के अनुसार:–

Proposals involving activity/project located within 10 km of National Park/Wildlife sanctuary wherein ESZ has not been finally notified and listed in the Schedule of the EIA Notification 2006 and requiring environment clearance, prior clearance from standing committee of the National Board for Wild Life will be required.

2. उक्तानुसार आवेदित खनन पट्टा क्षेत्रों में से क्र. सं. 24 से 30 तक अंकित एम.एल. नम्बर रणथम्भौर टाईगर रिजर्व के क्रिटिकल टाईगर हैबिटाट (सी.टी.एच) क्षेत्र की निकटतम वन सीमा से 10 कि.मी. की परिधि से बाहर है किन्तु रणथम्भौर टाईगर रिजर्व के टाईगर कन्जर्वेशन प्लान में राष्ट्रीय बाघ संरक्षण प्राधिकरण (N.T.C.A.) को प्रेषित टाईगर कोरीडोर के नक्शे के अनुसार रणथम्भौर–रामगढ़–मुकन्दरा टाईगर रिजर्व कोरीडोर के अन्दर स्थित है। इसलिए भारत सरकार, वन पर्यावरण एवं जलवायु परिवर्तन मंत्रालय (वन्य जीव संभाग) के पत्र एफ.एन.6–60 / 2020 वाईल्ड लाईफ पार्ट (1) दिनांक 16.07.2020 (प्रति संलग्न) के बिन्दु संख्या 3 (iii) के अनुसार:–

Proposals involving activity/project, falling outside the protected areas linking one protected area or Tiger Reserve with another protected area or Tiger Reserve prior clearance from the standing committee of the National Board for Wild Life as per the section 38 O(1)(g) of the Wild Life (Protection) Act,1972 will be required.

अतः ऐसी स्थिति में क्र. सं. 1 से 30 तक अंकित समस्त खनन प्रस्तावों पर भारत सरकार के उपरोक्त निर्देशों के अनुसार राष्ट्रीय वन्यजीव मण्डल की स्थायी समिति से पूर्व अनुमति लिया जाना आवश्यक है।

संलग्न :– उपरोक्तानुसार किता–1

भवदीय

(महेन्द्र कुमार शर्मा)
उप वन संरक्षक एवं उप क्षेत्रीय निदेशक
(प्रथम) बाघ परियोजना रणथम्भौर
सवाई माधोपुर

APPENDIX 10 : DCF, RTR-I (RJFD) letter to DMG Kota office, dated 7th March 2022

राजस्थान सरकार

कार्यालय खनि अभियन्ता, खान एवं भू–विज्ञान विभाग, कोटा

क्र.स.	नाम पट्टाधारी	एम.एल.नं.	निकट ग्राम	तहसील	जिला	क्षेत्र (है0)	खनिज	खननपट्टे की अवधि
1	श्री अनिल कुमावत पुत्र स्व0 श्री बजरंग लाल कुमावत निवासी टिक्कीवाला मोहल्ला, पुरानी टोंक, जिला टोंक	69/2001	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसेनरी स्टोन	28.12.2002 से 27.12.2052
2	श्री अनिल कुमावत पुत्र स्व0 श्री बजरंग लाल कुमावत निवासी टिक्कीवाला मोहल्ला, पुरानी टोंक, जिला टोंक	72/2001	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसेनरी स्टोन	24.02.2003 से 23.02.2053
3	श्री जितेन्द्र कुमावत पुत्र श्री भंवरलाल कुमावत टिक्कीवाला मोहल्ला पुरानी टोंक टोंक	67/2001	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसेनरी स्टोन	28.12.2002 से 27.12.2053
4	श्री जितेन्द्र कुमावत पुत्र श्री भंवरलाल कुमावत टिक्कीवाला मोहल्ला पुरानी टोंक टोंक	70/2001	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसेनरी स्टोन	24.02.2003 से 23.02.2053
5	श्री मालीराम कुमावत पुत्र भंवरलाल कुमावत निवासी टिक्कीवाला मोहल्ला पुरानी टोंक टोंक	65/2001	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसेनरी स्टोन	28.12.2002 से 27.12.2052
6	श्री राजेन्द्र कुमावत पुत्र श्री भंवरलाल कुमावत निवासी टिक्कीवाला मोहल्ला पुरानी टोंक जिला टोंक	71/2001	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसेनरी स्टोन	24.02.2003 से 23.02.2053
7	श्री भैरूप्रसाद माली पुत्र श्री माधोलाल माली निवासी छत्रपुरा तहसील इन्द्रगढ़ जिला बूंदी	64/2001	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसेनरी स्टोन	29.01.2003 से 28.01.2053
8	श्री भैरूप्रसाद माली पुत्र श्री माधोलाल माली निवासी छत्रपुरा तहसील इन्द्रगढ़ जिला बूंदी	68/2001	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसेनरी स्टोन	15.03.2003 से 14.03.2053
9	श्री कंचन देवी पत्नि श्री भैरूप्रसाद माली निवासी ग्राम छत्रपुरा तहसील इन्द्रगढ़ जिला बूंदी	17/2005	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसेनरी स्टोन	02.02.2010 से 01.02.2060
10	श्रीमती संतोष श्रीमाल पत्नि श्री ज्ञानचंद श्रीमाल निवासी 294, बरकत नगर, टोंक फाटक, गांधी नगर, जयपुर	62/2001	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसेनरी स्टोन	24.01.2003 से 23.01.2053
11	श्रीमती संतोष श्रीमाल पत्नि श्री ज्ञानचंद श्रीमाल निवासी 294, बरकत नगर, टोंक फाटक, गांधी नगर, जयपुर	7/2001	लाखेरी	इन्द्रगढ़	बून्दी	2.25	लाईमस्टोन (बर्निंग)	31.08.2006 से 30.08.2056

12	श्री चन्द्रप्रकाश श्रीमाल पुत्र श्री चिरंजीलाल श्रीमाल निवासी बिहारीजी के मन्दिर के पास, इन्द्रगढ़, बून्दी	61/2001	बालाजी की झूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	24.02.2003 से 23.02.2053
13	श्री चन्द्रप्रकाश श्रीमाल पुत्र श्री चिरंजीलाल श्रीमाल निवासी बिहारीजी के मन्दिर के पास, इन्द्रगढ़, बून्दी	22/1996	लाखेरी	इन्द्रगढ़	बून्दी	2.25	लाईमस्टोन (बर्निंग)	12.05.1998 से 11.05.1948
14	श्री सुरेशचंद श्रीमाल पुत्र चिरंजीलाल निवासी वार्ड नं. 4 इन्द्रगढ जिला बून्दी	10/1997	बालाजी की झूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	01.06.2000 से 31.05.2050
15	श्री सुरेशचंद श्रीमाल पुत्र चिरंजीलाल निवासी वार्ड नं. 4 इन्द्रगढ जिला बून्दी	93/2001	लाखेरी	इन्द्रगढ़	बून्दी	2.25	लाईमस्टोन (बर्निंग)	08.04.2008 से 07.04.2058
16	श्री दिनेश कुमार अग्रवाल पुत्र नरोत्तम लाल निवासी सुमेरगंजमण्डी, तहसील इन्द्रगढ़, जिला बूंदी	47/1999	बालाजी की झूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	29.07.2002 से 28.07.2052
17	श्री राजेन्द्र कुमार अग्रवाल पुत्र श्री नरोत्तम लाल निवासी सुमेरगंज मण्डी, तहसील इन्द्रगढ़, जिला बूंदी	152/1998	बालाजी की झूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	30.12.2000 से 29.12.2050
18	श्रीमति श्यामा देवी पत्नी श्री दिनेश कुमार निवासी 105 सुमेरगंजमंडी तहसील इन्द्रगढ़ जिला बून्दी	16/2004	बालाजी की झूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	29.12.2009 से 28.12.2059
19	श्रीमती गीता शर्मा पत्नि स्व0 श्री राधेश्याम शर्मा निवासी सैकण्डरी स्कूल के पास, रंगपुर रोड़, तह0 लाड़पुरा, जिला कोटा	62/1996	बालाजी की झूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	19.05.1998 से 18.05.2048
20	श्रीमती गीता शर्मा पत्नि स्व0 श्री राधेश्याम शर्मा निवासी सैकण्डरी स्कूल के पास, रंगपुर रोड़, तह0 लाड़पुरा, जिला कोटा	63/1996	बालाजी की झूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	19.05.1998 से 18.05.2048
21	श्री सुलेमान खां पुत्र श्री खुदाबक्श तेली निवासी नीम की चौकी शहर, सवाईमाधोपुर	64/2000	बालाजी की झूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	06.08.2002 से 05.08.2052
22	श्री अब्दुलसालाम पुत्र अब्दुल रहमान निवासी वार्ड नं. 12, जैन मंदिर के पास, इन्द्रगढ़, जिला बूंदी	65/2000	बालाजी की झूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	06.08.2002 से 05.08.2052
23	श्री घनश्याम सैनी पुत्र श्री रामफूल सैनी निवासी कुश्तला, सवाईमाधोपुर	63/2000	बालाजी की झूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	06.08.2002 से 05.08.2052
24	श्री महेन्द्रपाल सिंह पुत्र मोतीलाल मुंशी, निवासी सुमेरगंजमंडी तह. इन्द्रगढ जिला बूँदी	76/1996	बालाजी की झूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	21.12.2000 से 20.12.2050

25	श्री राजेन्द्र कुमार सुवालका पुत्र श्री बिरदीचंद निवासी 244, रानीपथ, रानीसती नगर, अजमेर रोड, जयपुर	30/1996	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	04.12.1996 से 03.12.1946
26	श्री ओम प्रकाश वर्मा पुत्र श्री मांगीलाल निवासी रेल्वे स्टेशन के पास, लाखेरी, तहसील के. पाटन जिला बूंदी	100/2006	बालाजी की डूंगरी	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	13.10.2006 से 12.10.2056
27	श्री गंभीर सिंह जादोन पुत्र श्री नत्थू सिंह निवासी सुभाष कॉलोनी, रणथम्भोर रोड, सवाईमाधोपुर	23/2003	मोहनपुरा	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	06.04.2004 से 05.04.2054
28	श्री सुरेश चंद गुप्ता पुत्र श्री भगवत प्रसाद, 30 बी, राजनगर, बजरिया , सवाईमाधोपुर	24/2003	मोहनपुरा	इन्द्रगढ़	बून्दी	1.00	मैसोनरी स्टोन	06.04.2004 से 05.04.2054
29	श्रीमति संतोष गोरवाल पत्नि श्री कमल प्रसाद गोरवाल निवासी सरावदा, तह0 इन्द्रगढ़, जिला बूंदी	29/1991	सखावदा	के. पाटन	बून्दी	0.72	मैसोनरी स्टोन / सैण्डस्टोन	06.06.1994 से 05.06.2044
30	श्रीमती निशा गर्ग पत्नि श्री दीपक गर्ग निवासी 181, शास्त्री नगर, दादाबाड़ी, कोटा	12/2004	लाखेरी	इन्द्रगढ़	बून्दी	1.7242	लाईमस्टोन (बर्निंग)	18.10.2010 से 17.10.2060

खनि अभियन्ता, कोटा

APPENDIX 11 : Brief description & note about the "*Decision Support System*"

The "Decision Support system" (DSS) contains all necessary and relevant shapefiles, images and maps necessary for easy and detailed visualisation for members of the Standing Committee, National Board for Wild Life (SC-NBWL) towards making informed decisions while appraising proposals around Ranthambhore Tiger Reserve, now and in the future. The following points may be noted in this regard.

1. The DSS contains three kinds of files – Shape files, Keyhole Markup Language (KML) files and Maps & Image files (jpeg, png etc.). There are multiple shape, KML and image files, each organised as three zipped folders. The three zipped folders along with a pdf of the final report with appendices are written into a compact disc (CD), and sent via India Post with hard copies of the Report.
2. All files with prefix or suffix containing "CISA" implies the relevant file concerns with the Cumulative Impact Study Area, i.e., a 10 km-radius width landscape around Ranthambhore Tiger Reserve (RTR) (but not including RTR itself) in Rajasthan state only.
3. The suffixes "WGS" and "LCC" in the GIS files indicate their coordinate reference systems 'World Geodetic System 1984' and 'Lambert Conformal Conic' projections, respectively.
4. The shapefiles can be opened on all GIS platforms/ softwares such as ArcMap and QGIS, while the KML files can be easily opened on Google Earth, QGIS etc.
5. The shapefiles contain all its dependent files as well, which open together (not individually).
6. All DSS files have self-explanatory file names. However, a "readme.txt" file with brief descriptions of all files is supplied separately in the CD sent along with hard copies of the Cumulative Impact Assessment Report.

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

WII-EIA/CIA Study around Ranthambhore TR_149 **27 March 2023**

To,

Sh. Bivash Ranjan, IFS
ADG (Wild Life) & Member-Secretary, SC-NBWL,
Ministry of Environment, Forest & Climate Change,
Indira Paryawaran Bhawan, Aliganj, Jor Bagh Road,
New Delhi – 110 003. Email: adgwl-mef@nic.in

Sub: Submission of the report "Cumulative Impact Study of a 10 km-radius landscape area around Ranthambhore Tiger Reserve towards identifying critical zones for wildlife & ensuring environment-friendly mining practices" – reg.

Ref.: MoEF&CC letter *F.No.6-175/2022 WL* dated 03.11.2022

Sir,

We are pleased to submit the report "*Cumulative Impact Study of a 10 km-radius landscape area around Ranthambhore Tiger Reserve towards identifying critical zones for wildlife & ensuring environment-friendly mining practices*" as requested by the Standing Committee of the National Board for Wild Life (SC-NBWL).

We have used a combination of available high-resolution occupancy and modelled suitable habitat data of threatened and Schedule-I mammalian species, their identified movement corridors within the larger Ranthambhore landscape and legally valid (as on date of submission) Eco-Sensitive Zones around Ranthambhore Tiger Reserve, Ramgarh-Vishdhari Tiger Reserve and National Chambal Sanctuary to delineate a composite "*critical zone for wildlife*" of c. 2136.7 sq.km within the total Cumulative Impact Study Area (CISA) of c. 3798.1 sq.km around Ranthambhore Tiger Reserve's 10 km-radius landscape.

The following two mining proposals under the SC-NBWL's consideration awaiting appraisal: Proposed Silica sand mining project M.L.No.09/2003 (4.2682 Ha) in Village Manoharpura, District Karauli of M/s Rama Minerals (FP/RJ/MIN/4863/2020) and Proposed Silica sand and Masonry stone mining project M.L.No.06/1982 (23.1726 Ha) in Village Richhotti, District Karauli of M/s Kumar Herbals (FP/RJ/MIN/5863/2021) may be positively appraised as the proposals do not fall within any of the components used to determine a composite "critical area" for wildlife in this study.

Overall, we highlight the need to conduct comprehensive studies regarding wildlife diversity, wildlife distribution, human-wildlife interactions and other such studies in the larger Ranthambhore landscape. We provide relevant shape files, keyhole markup language (KML) files, and full-resolution maps as a 'decision-support system' in a compact disc (CD) to enable easy visualisation of all relevant information concerning this assessment on GIS software for future appraisals in the landscape.

Thanking you,

Yours sincerely,

27/3/23

(Virendra R. Tiwari)
Director, WII

Copy for information to:

1. Principal Secretary, Rajasthan Forest Department. Email: env_raj@yahoo.co.in
2. PCCF (HoFF), Rajasthan Forest Department. Email: pccf.raj.forest@rajasthan.gov.in
3. PCCF (WL) & CWLW, Rajasthan Forest Department. Email: pccf.cwlw.forest@rajasthan.gov.in

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